Rebuilding Relief: A Policy Framework for Non-opioid Chronic Pain Treatment Adoption and Utilization in Medicaid Populations

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Date of Submission: 05/15/2025
Word Count: 14,228

Executive Summary

The opioid crisis continues to devastate communities across the United States, with Medicaid beneficiaries bearing a disproportionate burden due to systemic barriers that limit access to safer, non-opioid pain management options.[1–4] Despite Medicaid's role as the nation's largest insurer, its policies still reinforce opioids as the default treatment for chronic pain, fueling high rates of opioid use disorder (OUD), overdose, and long-term health complications.[5–8] While Medicaid expansion under the Affordable Care Act (ACA) has improved access to OUD treatment, [9] restrictive reimbursement policies, provider shortages, and state-level disparities have left non-opioid pain management alternatives significantly underutilized.[10–13] Addressing these structural shortcomings is essential to breaking the cycle of opioid dependency.

This paper examines the clinical, structural, and policy factors that limit access to non-opioid chronic pain treatment in Medicaid populations. A review of the literature demonstrates that non-opioid treatments are often equally or more effective than opioids for many types of chronic pain, with significantly lower risk of misuse and adverse events.[14–16] However, Medicaid beneficiaries—especially those in rural or underserved areas—encounter numerous obstacles to accessing these therapies. These include restrictive reimbursement policies, such as prior authorization and session limits;[17] significant provider shortages in key specialties;[18,19] and state-level disparities in Medicaid coverage, which lead to geographic inequities in care availability.[20–22]

The analysis also emphasizes the heterogeneity of the Medicaid chronic pain population—ranging from older adults with comorbidities to working-age adults, patients with co-occurring OUD, and pediatric patients—all of whom face distinct challenges and require tailored policy responses. Additionally, the fragmented structure of care delivery, in which the prescribers of non-opioid treatments are often disconnected from the providers who deliver them, further undermines the adoption of comprehensive pain management strategies.

In light of these findings, this paper presents a federal framework to reform Medicaid's approach to chronic pain management by incentivizing coverage for a core set of non-opioid therapies—such as physical therapy, cognitive-behavioral therapy (CBT), acupuncture, and other multimodal treatments. By implementing federal guidelines that standardize access to these therapies across state Medicaid programs, policymakers can reduce opioid reliance, expand treatment options for chronic pain, and create a more equitable and cost-effective healthcare system. This initiative would be reinforced through educational campaigns that increase provider and patient awareness of non-opioid alternatives, ensuring that these treatments are not only covered in theory but actively used in practice. Additionally, to incentivize state participation, the federal government should increase Medicaid matching funds (FMAP) for states that integrate non-opioid pain management into their programs and introduce a grant program to support provider networks, telehealth infrastructure, and access to care in underserved areas.

Recognizing the challenges posed by the federal political climate, this framework also proposes a coalition of willing states to serve as early adopters of these reforms, demonstrating their feasibility and impact on a smaller scale. These states—selected based on their extant Medicaid pain management policies and their exhibited need for OUD-related intervention—would function as laboratories for innovation, refining best practices in coverage policies,

telemedicine delivery models, and provider incentives. Their efforts would generate critical data on cost-effectiveness, health outcomes, and implementation strategies, strengthening the case for national adoption while mitigating political and financial risks at the federal level.

Beyond policy expansion, provider participation is key to the success of these reforms. Many Medicaid providers hesitate to offer non-opioid treatments due to low reimbursement rates, bureaucratic hurdles, and a lack of institutional support, contributing to an overreliance on opioid prescriptions.[23,24] To reverse this trend, this framework calls for increased Medicaid reimbursement rates for non-opioid therapies, the removal of burdensome prior authorization requirements, and financial incentives for providers who integrate multimodal pain management into their practices. Additionally, federally funded provider training programs should be established to promote evidence-based non-opioid pain management strategies while avoiding regulatory burdens that discourage provider participation. A voluntary incentive program—rewarding providers who complete training and increase their use of non-opioid treatments—would further encourage adoption without discouraging Medicaid participation.

To ensure accountability and effectiveness, this framework also calls for the Centers for Medicare and Medicaid Services (CMS) to track opioid prescribing trends and regularly evaluate state-level non-opioid pain management programs. These evaluations—measuring health outcomes, patient satisfaction, and cost-effectiveness—would provide the necessary data to refine policy approaches, share best practices, and guide broader national adoption. By continuously assessing the impact of non-opioid policies, Medicaid can ensure that its pain management strategies remain evidence-based, responsive, and fiscally sustainable.

This analysis draws upon a comprehensive literature review, case studies, and established policy assessment frameworks—including the PESTEL framework—to evaluate the feasibility and impact of these reforms. Additionally, the CMS Framework for Health Equity Priorities and the Chronic Care Model inform the development of a policy framework that prioritizes comprehensive and equitable non-opioid pain management for Medicaid beneficiaries. Given Medicaid's vast reach and influence, federal action is essential to establishing uniform standards, ensuring equitable access, and maximizing long-term cost savings.

The opportunity to reshape Medicaid's pain management strategy is urgent and clear. CMS has the power to lead a nationwide shift away from opioid-centric treatment models and toward a patient-centered approach that prioritizes non-opioid pain management. These reforms would not only reduce opioid dependence and improve patient health outcomes but also create a more sustainable, equitable, and cost-effective Medicaid program. The time to act is now.

Stuck in the Cycle

Carla is a 44-year-old woman living in rural Kentucky. A single mother of two, she works part-time at a local grocery store and has been struggling with chronic lower back pain for over six years following a workplace injury. She qualifies for Medicaid, which covers her basic medical care, but doesn't offer much help with her pain beyond prescriptions.

Carla's primary care provider wants to help but is constrained by time and resources. The clinic doesn't have an in-house physical therapist or behavioral health provider. When Carla asks about alternatives like acupuncture or therapy, she's told that Medicaid doesn't cover them or requires so much paperwork that it's not worth the trouble. Worse, she's never had a provider who seemed to have the time to really listen to her concerns, so she often feels dismissed and alone

Instead, Carla leaves each appointment with another refill of hydrocodone. It dulls the pain just enough to get her through a shift, but her tolerance has built up. She needs more to achieve the same effect and now fears withdrawal if she stops. She's not addicted, she insists, she's functional. But deep down, she knows she's dependent.

A few months later, Carla slips on ice and ends up in the ER. She's taken off her medications abruptly, and the pain comes roaring back. The ER doctor won't prescribe opioids due to new hospital guidelines and recommends physical therapy instead. But Carla can't find a Medicaid PT provider within 50 miles, and has no reliable transportation anyway. She returns home in agony, angry, and stuck. Her trust in the system is gone.

Introduction: Background and Significance

Opioids, Chronic Pain, and Medicaid

The opioid crisis—a dramatic increase in opioid misuse, addiction, and overdose deaths—has emerged as one of the most severe public health challenges in recent U.S. history, fueled generally by the overprescription of opioid pharmaceuticals for pain management.[5] In 2023, over 107,000 deaths were attributed to opioid overdoses alone, a significant portion of which likely began with prescription medications intended to treat chronic pain.[5,6] While the crisis spans all demographics, Medicaid recipients—a particularly vulnerable population—are disproportionately affected due to higher rates of chronic pain and limited access to non-opioid alternatives.[2,5]

The Burden of Chronic Pain

Chronic pain is a multifaceted condition defined as pain lasting longer than six months or persisting beyond the typical healing time for an injury.[144] Unlike acute pain, which signals injury, chronic pain serves no clear biological purpose.[145] It can impair daily life, reduce quality of life, and contribute to depression, anxiety, and sleep disturbances.[144,146–148] Managing chronic pain is challenging and requires consideration of biological, psychological, and social factors.[149,150]

Causes vary and include nociceptive pain from tissue damage (e.g., arthritis), neuropathic pain from nerve damage (e.g., diabetic neuropathy), and nociplastic pain, where nervous system sensitization heightens pain perception (e.g., fibromyalgia).[151] Effective treatment depends on the pain type: nociceptive pain may respond to anti-inflammatories or physical therapy, while neuropathic pain often requires anticonvulsants or antidepressants. Emerging treatments for nociplastic pain focus on neuromodulation, cognitive-behavioral therapy (CBT), and mindfulness-based stress reduction (MBSR). Given its complexity, chronic pain management typically requires a multidisciplinary approach integrating medical, psychological, and rehabilitative strategies.[53,155]

When adjusting for age, the prevalence of chronic pain is likewise significantly higher among Medicaid and other public insurance enrollees than among those with private insurance.[1] Additionally, Medicaid beneficiaries constitute a population that is regularly barred from effective related

treatment by a range of socioeconomic and policy-related barriers.[2–4] This lack of access to comprehensive healthcare and preventive services for chronic pain leaves many in this population reliant on opioids for pain management, fueling cycles of dependency and widening health disparities.[7,8] This reliance not only elevates health risks for individuals but also contributes to broader public health and economic challenges within Medicaid.

A range of data indicates that the widespread use of opioids for managing chronic pain among Medicaid populations has intensified the opioid epidemic. Medicaid beneficiaries are prescribed opioids at twice the rate of non-Medicaid populations, and their risk of developing opioid use disorder (OUD) is, consequently, significantly higher.[3,25] Additionally, due to tolerance, opioid therapies often provide diminishing benefits over time, necessitating higher doses and increasing the risk of dependence.[25,26] This dependency also places a substantial economic strain on both state and federal Medicaid programs. Between 2010 and 2017, Medicaid spending on opioid-related prescriptions and treatments for OUD surged, with spending on treatment medications such as buprenorphine and naloxone alone more than quadrupling;[7,27] similarly, between 1999 and 2013, annual Medicaid costs associated with OUD in 17 states increased from $919 million to more than $3 billion.[26]

The Value and Threat of Opioid Treatment

Opioids are compounds derived from the opium poppy (*P. somniferum*) or similar compounds synthesized artificially.[149] They include prescription pain relievers like oxycodone, hydrocodone, morphine, codeine, and fentanyl, as well as illicit drugs like heroin. Opioids block pain signals while triggering dopamine release, inducing euphoria.[150,151] They also suppress respiration, making overdose fatal, especially when combined with depressants like alcohol or benzodiazepines.[152]

Opioids are generally safe for short-term pain relief, such as post-surgery or cancer treatment, and incredibly valuable in cases where individuals are not responding to other forms of pain management.[18] However, prolonged or undirected use can lead to tolerance (requiring higher doses for the same effect) and dependence (withdrawal symptoms upon discontinuation).[153,154] Prolonged opioid use can also lead to opioid use disorder (OUD), characterized by compulsive drug-seeking behavior, loss of control over drug use, and continued use despite harmful consequences.[18]

This rising cost is attributable not only to the direct expenses of opioid prescriptions but also to the management of OUD-related complications, including emergency room visits, inpatient care, and rehabilitation services.[3,26] The long-term financial strain on Medicaid programs underscores the need for a shift away from opioid-based therapies and toward more financially sustainable, non-opioid alternatives.[3,4,26]

Evidence of the Effectiveness of Non-Opioid Interventions

Research consistently demonstrates that non-opioid interventions, such as physical therapy, acupuncture, non-opioid pharmaceuticals, and behavioral therapies, are effective alternatives for managing chronic pain.[3,25] These treatments provide comparable or even superior pain relief compared to opioid-based therapies, without the coupled risks of addiction or overdose.[14,15,25,28,29] For instance, studies have shown that physical therapy can effectively reduce chronic pain and improve physical functionality, particularly for musculoskeletal conditions, with a significantly lower risk of opioid dependence.[16]

Comparative effectiveness studies further highlight the benefits of non-opioid therapies: many patients receiving non-opioid treatments report better long-term outcomes in terms of pain reduction and development of adverse events (nausea, vomiting, erectile dysfunction, OUD, etc.) compared to those on opioid therapies, while also experiencing lower discontinuation rates.[15] These approaches also lower the risk of opioid misuse and related health complications, making them crucial in the effort to reduce opioid dependency among Medicaid populations.[14]

Current Barriers to Non-Opioid Pain Management in Medicaid Populations

Non-opioid treatment options are not as widely accessible to Medicaid beneficiaries as they are to individuals with private insurance.[4,7] Many Medicaid recipients, for example, live in rural areas, where non-opioid treatment options are scarce.[4,7]

Structural challenges further complicate the integration of non-pharmacological treatments into pain management for Medicaid populations. Provider shortages, particularly in rural regions, limit patients' ability to access comprehensive care.[30] Variations in opioid prescribing practices across different healthcare settings also contribute to these challenges. Emergency department providers, for example, are more likely to prescribe opioids for pain, whereas primary care providers may have more opportunities to implement long-term pain management strategies.[3,4] However, inconsistent prescribing practices between these settings create risks for patients, who may receive higher-than-necessary opioid dosages in acute care settings.[3,7]

Medicaid the Payor, Medicaid the Policymaker

Medicaid is a joint federal-state insurance program providing healthcare coverage to low-income individuals and families.[144] Established in 1965, it is the largest single U.S. health insurer, covering over 74 million Americans as of 2023.[13] Funded through federal-state partnerships, the federal government sets guidelines while states design and administer their programs, leading to variations in eligibility, benefits, and reimbursement rates.[144] Therefore, while certain minimum standards must be met across all states, specific eligibility criteria, benefits, and reimbursement rates can vary widely depending on the state in question.[145]

Federal funding is provided through the Federal Medical Assistance Percentage (FMAP), which covers 50-78% of state Medicaid costs based on per capita income.[146] The Affordable Care Act expanded Medicaid eligibility in 2014, but the opting out of some states has exacerbated coverage disparities.[9]

Despite broad coverage, providers are not required to accept Medicaid, and many decline due to lower reimbursement rates compared to private insurance and Medicare.[149] This limits access to timely care, further exacerbating healthcare disparities for Medicaid recipients.[149]

Additionally, Medicaid's reimbursement policies often do not adequately cover the cost of non-opioid pain management services.[31] As a result, many Medicaid beneficiaries remain reliant on opioid prescriptions, perpetuating the cycle of opioid misuse and increasing the risk of overdose and OUD.[4,7]

Policy Gaps and Implications for Medicaid

It is clear, then, that existing Medicaid policies often fail to promote comprehensive pain management approaches that incorporate non-opioid alternatives. While Medicaid expansion under the Affordable Care Act (ACA) has improved access to OUD treatments in many states, significant gaps remain in the availability and coverage of non-opioid therapies for chronic pain

that might mitigate much of the need for OUD treatments a priori.[2,32] These gaps create policy-level barriers, particularly where Medicaid programs impose restrictive prior authorization requirements or offer limited reimbursement for non-pharmacological treatments,[33] hindering the consistent application of effective alternatives that could alleviate risks of opioid dependency.

The inconsistencies across state Medicaid programs exacerbate these barriers. Due to variations in state-level policies, many beneficiaries are unable to access the full spectrum of evidence-based non-opioid interventions that could improve their pain management outcomes.[33] Without expanded and consistent coverage for non-opioid therapies, Medicaid beneficiaries often find opioids as their primary, if not sole, option for managing chronic pain.[3,4]

Clarifying the Role of Opioids in Pain Management

While this paper advocates for expanding access to non-opioid treatments for chronic pain management in Medicaid populations, it does not argue for the elimination of opioid therapies altogether. Opioids remain a critical tool in pain management, particularly for acute pain, post-surgical recovery, cancer-related pain, and palliative care.[28] For certain chronic pain patients, particularly those for whom other interventions have failed, opioids may provide the most effective and accessible form of relief.[34] When prescribed and monitored appropriately, opioids can improve quality of life, reduce suffering, and remain a cost-effective treatment option.[34]

The challenge lies in ensuring that opioids are used judiciously and selectively, prescribed when truly necessary while avoiding routine reliance for chronic pain management when evidence-based alternatives exist. Current Medicaid policies often fail to facilitate this balance, defaulting to opioid prescriptions due to restrictive reimbursement policies and provider shortages that limit access to alternative treatments.[34,35] The goal of this paper is to realign Medicaid's approach so that non-opioid therapies become the first-line options for managing chronic pain where appropriate, while preserving access to opioids for patients who genuinely need them. By promoting a more comprehensive and patient-centered approach, this policy framework seeks to reduce opioid dependency without compromising pain relief for those who benefit from opioid-based treatment.

Methodology

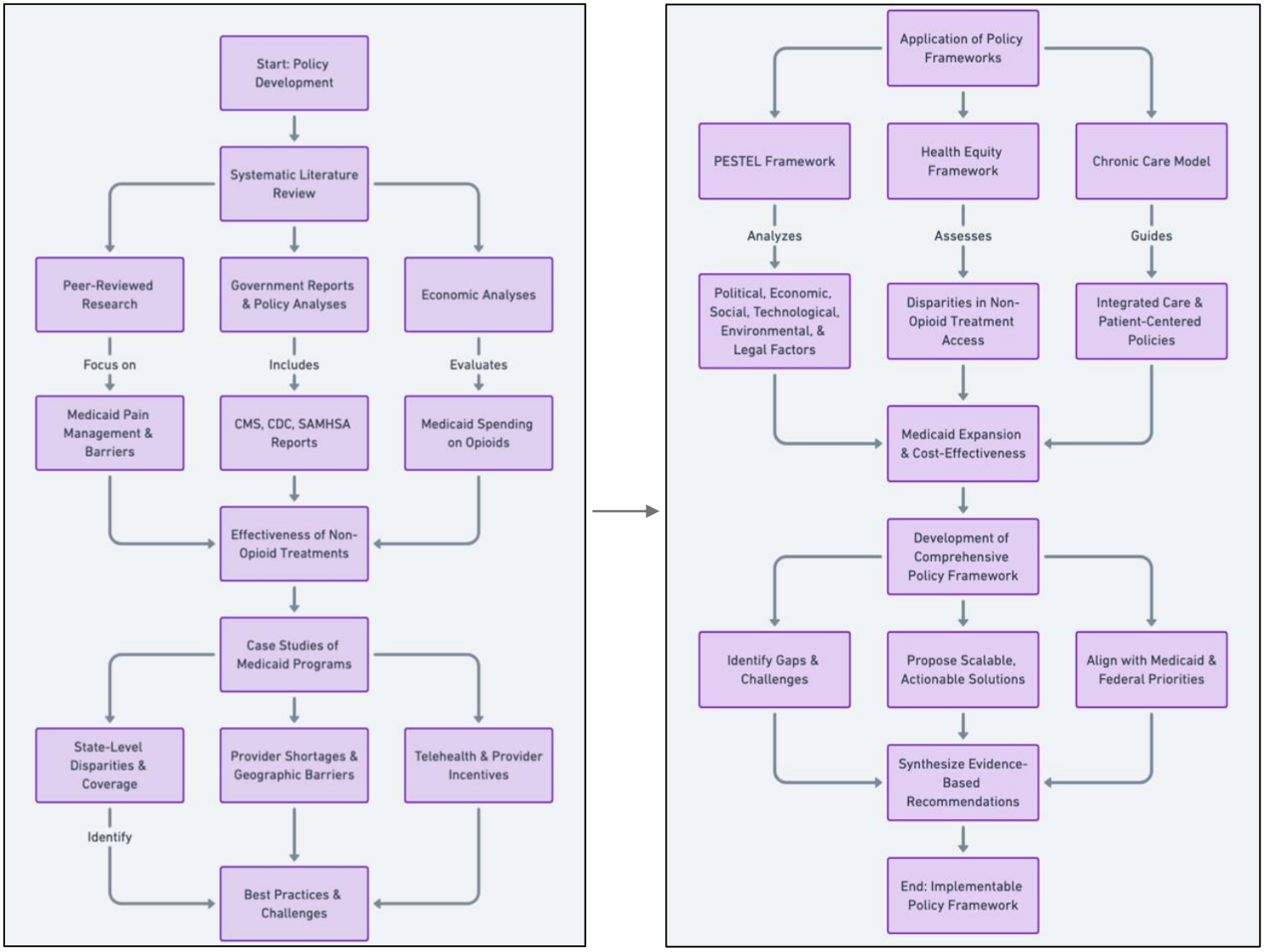

Figure 1. Policy Framework Development Process

This paper develops a comprehensive policy framework to expand access to non-opioid chronic pain treatments for Medicaid beneficiaries, using a structured analysis of existing literature, case studies, and guiding policy frameworks. It begins with a systematic review of peer-reviewed research, government reports, and policy analyses to examine Medicaid's role in pain management and the systemic barriers that limit access to non-opioid alternatives. This review includes studies on opioid prescribing trends, Medicaid reimbursement policies, geographic disparities in care, and the effectiveness of non-opioid treatments such as physical therapy, cognitive behavioral therapy (CBT), acupuncture, and non-opioid pharmaceuticals. Key sources include research from the Centers for Medicare & Medicaid Services (CMS), the Centers for Disease Control and Prevention (CDC), and the Substance Abuse and Mental Health Services Administration (SAMHSA), as well as economic analyses of Medicaid spending on opioid-related care.

In addition to reviewing the literature, this paper incorporates case studies of Medicaid programs and other public health initiatives that have implemented non-opioid pain management strategies. These case studies highlight best practices in regions that have expanded Medicaid coverage for non-opioid therapies and analyze the logistical and regulatory challenges encountered in doing so. Special attention is given to state-level disparities in coverage, as Medicaid's structure allows significant variation in benefits, prior authorization requirements, and provider reimbursement across states. Examining these inconsistencies provides insight into the policy levers that can be used to standardize access to non-opioid pain management across Medicaid programs. Furthermore, these case studies illustrate the role of geographic disparities and provider shortages in limiting access, particularly in rural and medically underserved communities where non-opioid pain treatments are often unavailable. The paper also explores how telehealth and innovative provider incentive programs may help overcome these limitations, drawing on existing policy models that have successfully expanded healthcare access.

To structure its analysis and policy development, this paper employs three key policy frameworks: the PESTEL framework, the CMS Framework for Health Equity Priorities, and the Chronic Care Model (CCM). The PESTEL framework examines the political, economic, social, technological, environmental, and legal factors influencing Medicaid pain management policies.[36] Politically, Medicaid expansion under the Affordable Care Act (ACA) has improved access to opioid use disorder (OUD) treatment, yet non-opioid pain management remains inconsistently covered due to state-level policy decisions. Economic considerations focus on the cost-effectiveness of expanding non-opioid treatments and the long-term savings that could result from reducing opioid dependency, emergency room visits, and Medicaid spending on OUD treatment. Social factors include stigma surrounding non-opioid treatments, while technological factors assess the role of telemedicine in expanding access to physical therapy, behavioral therapy, and specialist consultations. Environmental factors address the distribution of providers and geographic barriers to care, while legal considerations analyze Medicaid reimbursement structures and regulatory restrictions on alternative treatments.

The CMS Framework for Health Equity Priorities is applied to evaluate disparities in access to non-opioid pain management, particularly among low-income, rural, and minority Medicaid populations.[37] Medicaid beneficiaries disproportionately suffer from chronic pain but face structural barriers, including restrictive reimbursement policies, limited provider availability, and geographic isolation. By identifying these disparities, the paper ensures that proposed policy solutions are designed to promote equitable access to effective pain management. Additionally, the Chronic Care Model (CCM) informs the structure of policy recommendations by emphasizing the importance of integrated, interdisciplinary care teams, care coordination, and patient self-management support.[38] Chronic pain requires ongoing management rather than reactive treatment, and the CCM provides a framework for designing Medicaid policies that support long-term, sustainable, and patient-centered pain care.

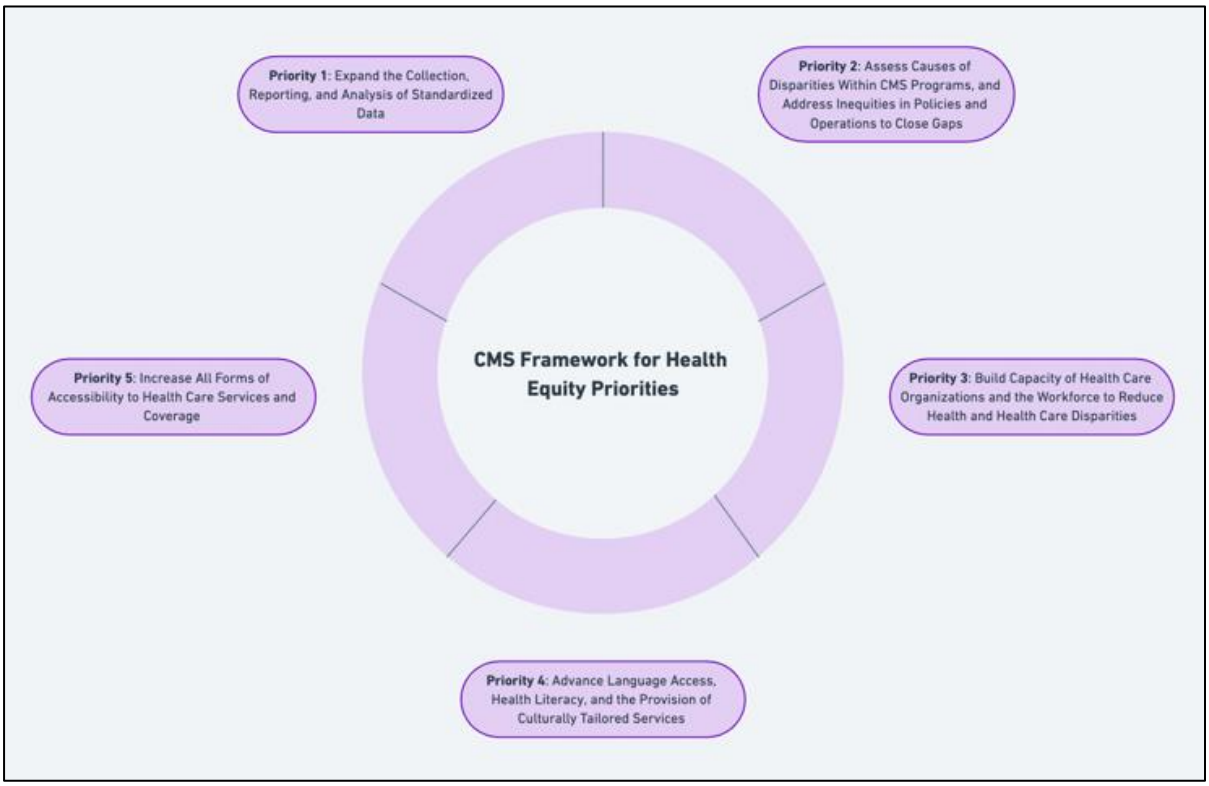
Priority 1: Expand the Collection, Reporting, and Analysis of Standardized Data
Priority 2: Assess Causes of Disparities Within CMS Programs, and Address Inequities in Policies and Operations to Close Gaps
CMS Framework for Health Equity Priorities
Priority 5: Increase All Forms of Accessibility to Health Care Services and Coverage
Priority 3: Build Capacity of Health Care Organizations and the Workforce to Reduce Health and Health Care Disparities
Priority 4: Advance Language Access, Health Literacy, and the Provision of Culturally Tailored Services

Figure 2. CMS Framework for Health Equity Priorities[39]

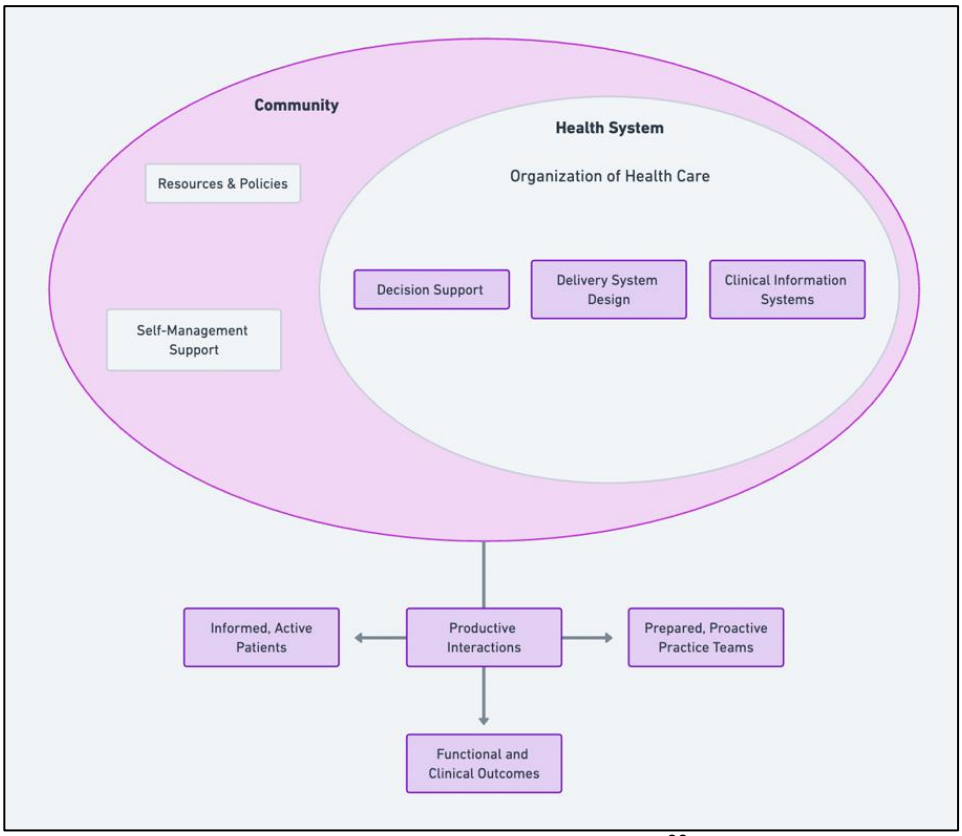

Figure 3. Chronic Care Model (CCM)[38]

This paper focuses on developing a single comprehensive policy framework that aligns with existing Medicaid structures and federal health priorities. It identifies key policy gaps, implementation challenges, and practical solutions to expand non-opioid pain management under Medicaid. Stakeholder considerations are integrated by reviewing past legislative efforts and policy initiatives related to Medicaid pain management, drawing on historical stakeholder responses rather than conducting new stakeholder interviews. Internal stakeholders include CMS policymakers, Medicaid administrators, and public health officials, while external stakeholders include state Medicaid agencies, healthcare providers, advocacy organizations, and pain management researchers.

By synthesizing insights from peer-reviewed studies, case studies, economic analyses, and policy frameworks, the paper provides an evidence-based, practically implementable framework for expanding non-opioid chronic pain management under Medicaid. The structured approach ensures that policy recommendations are not only theoretically sound but also actionable, scalable, and responsive to the needs of Medicaid beneficiaries, providers, and administrators.

Literature Review

The management of chronic pain among Medicaid beneficiaries presents a critical public health challenge, especially against the backdrop of the opioid crisis. Research has consistently demonstrated that non-opioid therapies, including physical therapy, acupuncture, cognitive-behavioral therapy (CBT), and non-opioid pharmacological options, are effective alternatives for managing chronic pain, not only reducing pain levels but also improving overall functionality and quality of life.[3,14,15,25,28,29] They are also often associated with better long-term outcomes compared to opioids, which carry significant risks such as dependency, overdose, and a range of adverse physical and psychological side effects.[14–16] Additionally, following shorter-term program expense increases due to the higher cost nature of non-opioid therapies, Medicaid would likely experience a long-term reduction in payment due to a corresponding decrease in OUD-related complications.[26] Despite the compelling evidence supporting non-opioid therapies, systemic barriers, gaps in the literature, and significant uncertainties have limited their integration into Medicaid pain management strategies.

Strengths of Existing Research

A robust body of evidence underscores the efficacy of non-opioid treatments for various types of chronic pain, including musculoskeletal, neuropathic, and nociplastic pain. Studies have shown that physical therapy can reduce reliance on opioids while improving mobility and reducing pain in conditions such as osteoarthritis and chronic back pain.[40] Acupuncture has been validated in numerous randomized controlled trials (RCTs) as an effective modality for managing chronic neck pain, back pain, and migraines.[41,42] Similarly, CBT has been recognized as a powerful tool for addressing the psychological dimensions of chronic pain, such as anxiety and depression, while concurrently reducing pain severity.[43]

Comparative studies have further highlighted the benefits of non-opioid therapies. For example, research comparing opioid-based pain management to non-opioid alternatives

consistently finds that the latter provides comparable pain relief with fewer adverse effects and complications.[44] These findings are particularly relevant for Medicaid populations, where the prevalence of OUD and related health complications is significantly higher than in other demographic groups.[45] Moreover, non-opioid therapies are often associated with improved patient satisfaction and quality of life, as they address both the physical and psychological components of chronic pain, providing a more holistic approach to care.[46]

Economic analyses also support the adoption of non-opioid therapies. By reducing the incidence of OUD and the need for costly treatments like MAT, emergency department visits, and inpatient hospitalizations, non-opioid treatments can significantly lower healthcare expenses, particularly for Medicaid.[47] For instance, studies have demonstrated that early physical therapy can prevent chronic pain from worsening, reducing long-term healthcare expenditures.[48] The economic benefits of non-opioid therapies are particularly compelling given the significant financial burden of the opioid crisis on Medicaid budgets.[7,26,27]

Limitations of Existing Research

Despite these strengths, there are notable gaps in the literature that limit the applicability and generalizability of existing findings. One major limitation is the lack of Medicaid-specific studies. Much of the existing research on non-opioid therapies focuses on general or privately insured populations, leaving significant questions about how these treatments perform in the unique context of Medicaid. Medicaid beneficiaries face distinct challenges, including lower socioeconomic status, higher rates of comorbidities,[49] and significant barriers to accessing healthcare services.[50] These factors are often not accounted for in existing studies, creating uncertainty about the effectiveness of non-opioid treatments within this population.

Another limitation is the insufficient exploration of geographic and demographic disparities in access to non-opioid therapies. Rural Medicaid recipients, in particular, face significant barriers to accessing health services due to provider shortages and transportation challenges.[51] While some studies do acknowledge these disparities, they often fail to provide granular data on how these factors impact treatment outcomes. Additionally, racial and ethnic disparities in access to and utilization of non-opioid treatments within Medicaid remain underexplored, despite evidence suggesting that minority populations are less likely to receive these therapies.[52]

The literature also lacks long-term studies evaluating the sustainability and cost-effectiveness of non-opioid treatments. While short-term analyses demonstrate promising results,[53] there is limited evidence regarding the long-term economic and clinical impacts of these therapies. For instance, questions remain about whether the initial cost savings associated with non-opioid treatments persist over time, particularly in Medicaid populations with complex healthcare needs. Furthermore, there is a lack of research examining the effectiveness of non-opioid therapies for chronic pain conditions beyond musculoskeletal pain, such as neuropathic and nociplastic pain, which can be common among Medicaid beneficiaries.

Key Uncertainties

Several key uncertainties in the existing research warrant further investigation. First, there is limited evidence on how Medicaid reimbursement policies specifically impact the adoption of non-opioid treatments. While studies suggest that higher reimbursement rates and reduced administrative barriers could incentivize providers to become more engaged with OUD reduction and treatment,[54] more rigorous evaluations are needed to confirm these hypotheses. Similarly, the role of provider education and training in promoting the use of non-opioid treatments remains unclear. Research is needed to determine the most effective methods for training providers and integrating non-opioid pain management into standard clinical practice.

Second, the effectiveness of patient education initiatives in increasing awareness and utilization of non-opioid therapies is poorly understood. While some studies suggest that educational campaigns can improve patient engagement,[55] there is limited evidence on how these initiatives perform in Medicaid populations specifically, particularly those with low health literacy or significant socioeconomic barriers to care. Additionally, more research is needed to explore the role of telemedicine and other innovative delivery models in addressing geographic and provider access disparities.

Finally, there is a lack of comparative analyses examining the effectiveness of different policy approaches to integrating non-opioid treatments into Medicaid. For instance, while some states have implemented more progressive policies that allow for expanded access to these therapies, others have maintained more restrictive practices.[56] Understanding the factors that contribute to successful policy implementation could provide valuable insights for scaling effective approaches nationwide.

Opportunities for Rapid Learning

The identified gaps and uncertainties present significant opportunities for rapid learning through disciplined policy experiments. Pilot programs targeting underserved areas, such as rural or low-income communities, or willing states could provide valuable data on the feasibility and impact of non-opioid treatments in diverse Medicaid populations. For example, testing telemedicine-based delivery models for physical therapy and CBT could address provider shortages and transportation barriers, while evaluating their effectiveness in reducing opioid dependency and improving pain management outcomes.

Comparative analyses of state Medicaid programs with varying policies on non-opioid treatments could also yield actionable insights. By examining differences in outcomes such as opioid prescribing rates, healthcare expenditures, and patient satisfaction, researchers can identify best practices and inform future policy decisions. Additionally, studies exploring the impact of provider and patient education initiatives on the adoption and effectiveness of non-opioid therapies could help refine strategies for promoting these treatments.

Tracking shifts in Medicaid claims data before and after policy changes—specifically, utilization trends for non-opioid treatments versus opioid prescriptions—could offer real-time insights into how coverage expansions influence provider prescribing behaviors and patient treatment choices. Furthermore, conducting structured patient-reported outcome surveys within Medicaid populations could capture qualitative data on pain management experiences, treatment satisfaction, and functional improvements, helping policymakers refine non-opioid pain management strategies based on direct beneficiary feedback.

Section Conclusion

While the existing literature provides strong evidence supporting the efficacy and economic benefits of non-opioid treatments for chronic pain, significant gaps and uncertainties remain. Future research should prioritize Medicaid-specific populations, address disparities in access and utilization, and evaluate the long-term impacts of non-opioid therapies. Opportunities for rapid learning through pilot programs and comparative policy analyses offer a pathway to refining Medicaid pain management strategies and ensuring equitable access to effective, evidence-based care. By addressing these gaps, policymakers can create a more sustainable and equitable healthcare system that prioritizes the well-being of Medicaid beneficiaries while mitigating the opioid crisis.

Findings

The following section examines the effectiveness of various non-opioid chronic pain management interventions, including physical therapy, acupuncture, non-opioid pharmaceuticals, and behavioral therapies. Additionally, it explores the systemic barriers to accessing these treatments, such as restrictive Medicaid reimbursement policies, provider shortages, and geographic disparities. Finally, it evaluates the role of federal and state policies in expanding access to non-opioid treatments, highlighting the policy incentives that influence the adoption of multimodal pain management strategies through a PESTEL analysis. By understanding these factors, policymakers can better address the challenges limiting access to effective, non-opioid pain treatments and develop targeted solutions to reduce opioid dependence and improve patient outcomes.

Effectiveness of Non-Opioid Chronic Pain Management Interventions

Physical Therapy (PT)

PT is a first-line intervention that improves movement, function, and quality of life through exercise, manual therapy, and education.[57–60] It reduces pain sensitization, strengthens musculoskeletal function,[61] and corrects movement dysfunctions.[62] PT is particularly effective for chronic low back pain,[63] osteoarthritis,[63] and fibromyalgia,[64] with early intervention lowering opioid dependence and healthcare costs.[16,29,40,65,66]

Acupuncture

Acupuncture modulates pain perception through central nervous system stimulation,[67] endogenous opioid release,[68] and inflammation regulation.[69] Large-scale studies confirm its effectiveness for conditions like chronic back and neck pain, osteoarthritis, and migraines.[70] Acupuncture has been shown to reduce opioid dependence, with research demonstrating lower opioid prescriptions and consumption among patients receiving acupuncture.[71–74] Endorsements

from major medical organizations, including the American College of Physicians and the CDC, highlight its growing acceptance.[75]

Non-Opioid Pharmaceuticals

Acetaminophen, non-steroidal anti-inflammatory drugs (NSAIDs), anticonvulsants (e.g., gabapentin, pregabalin), and antidepressants (e.g., TCAs, SNRIs) provide effective pain relief through various mechanisms while mitigating opioid dependence. NSAIDs are as effective as opioids for musculoskeletal pain,[29] while anticonvulsants and antidepressants reduce neuropathic pain.[76] Emerging medications like suzetrigine offer novel, non-addictive options.[77] Clinical evidence supports multimodal analgesia—combining these medications with other therapies—to enhance pain relief while minimizing opioid reliance.[78]

Behavioral Therapies & Non-Pharmacological Interventions

Cognitive-behavioral therapy (CBT), acceptance and commitment therapy (ACT), and mindfulness-based stress reduction (MBSR) address the psychological aspects of pain, improving coping mechanisms and reducing distress.[43,79,80] Studies confirm their efficacy in lowering pain intensity and opioid use.[79,81–83] Other interventions, such as TENS and biofeedback, provide additional pain relief by modulating nerve activity and physiological responses to pain stimuli.[84,85]

Further Details in the Appendix

For a comprehensive review of the evidence supporting these interventions, including specific studies, outcome measures, and comparative effectiveness data, refer to the detailed table in the appendix (Table 1). This table provides an in-depth breakdown of each approach, summarizing key clinical findings, mechanisms of action, and their impact on opioid use reduction. There, readers seeking granular data and study citations will find a more exhaustive analysis.

Barriers to Non-Opioid Treatment Access in Medicaid

Restrictive Medicaid Reimbursement Policies

Despite the increasing recognition of non-opioid treatments as effective and safer alternatives for pain management, restrictive Medicaid reimbursement policies continue to limit access to these interventions. These policies create significant barriers to comprehensive pain management, often forcing providers and patients to rely on opioids due to their broader coverage and lower cost. As policymakers and public health experts seek to reduce opioid dependence and improve pain management outcomes, addressing Medicaid reimbursement restrictions for non-opioid treatments is essential.

Medicaid reimbursement policies significantly impact the types of treatments available to beneficiaries. Historically, opioids have been widely covered under Medicaid due to their low cost and immediate analgesic effects. In contrast, many non-opioid alternatives—such as physical therapy, acupuncture, chiropractic care, CBT, MSBR, and interventional pain management techniques—face stringent prior authorization requirements, session limits, or are entirely excluded from coverage in certain states.[17] For example, while nearly all state Medicaid

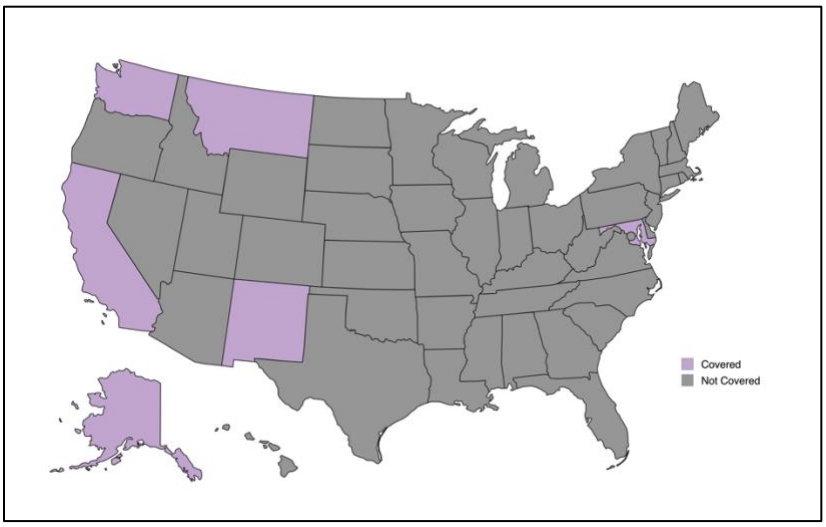

Figure 4. State Medicaid Coverage of Acupuncture[113]

programs cover opioids with minimal restrictions, fewer than 10 states offer comprehensive coverage for acupuncture, massage, or biofeedback therapy and no state covers MBSR;[75] in states where CBT and biofeedback therapy are covered, it is often exclusive to mental health diagnoses.[75] Additionally, 40 states as of 2018 provide some form of coverage for physical therapy services, but 24 of those apply limits on said services and 13 require a copayment.[86] These limitations disproportionately affect Medicaid recipients, who regularly lack the financial resources to pay out-of-pocket for non-opioid treatments.

One of the key barriers created by restrictive Medicaid reimbursement policies is prior authorization requirements for non-opioid treatment; many Medicaid programs require extensive documentation, physician justification, and evidence of opioid failure before approving access to treatments like physical therapy or behavioral therapy.[2] This bureaucratic process delays care and discourages providers from prescribing non-opioid treatments in favor of opioids, which require fewer administrative hurdles and therefore less time from diagnosis to administration.[35] A report from the CDC, for example, found that prior authorization delays lead to increased opioid prescriptions, as physicians often opt for medications that can be dispensed immediately rather than waiting for non-opioid treatment approvals.[28]

Additionally, session limits and cost-sharing requirements further restrict access to non-opioid treatments. Many state Medicaid programs impose annual session caps on physical therapy, chiropractic care, and mental health counseling, regardless of patient need.[87] For example, a Medicaid enrollee with chronic back pain may only be approved for 10 physical therapy sessions per year, even if clinical guidelines recommend ongoing therapy for effective pain management.[88] In contrast, opioid prescriptions have no such limitations, making them the more accessible option for both patients and providers. Cost-sharing requirements, such as co-pays for physical therapy or alternative treatments, may also discourage Medicaid patients from pursuing non-opioid options, as many beneficiaries cannot afford additional out-of-pocket expenses.

The impact of restrictive Medicaid reimbursement policies is evident in patient outcomes. Research has shown that Medicaid patients with chronic pain are more likely to receive opioids compared to those with private insurance, largely due to limited access to alternative treatments.[3] Additionally, a study published in the *Clinical Journal of Pain* found that Medicaid enrollees with chronic non-cancer pain who engaged in opioid prescription-based therapies experienced significantly higher rates of OUD compared to those without such engagement.[89]

Recent policy initiatives have attempted to address these disparities, but challenges remain. The Centers for Medicare & Medicaid Services (CMS) has encouraged states to expand coverage for non-opioid treatments through grant programs and pilot initiatives.[90] Some states, such as Vermont and Oregon, have begun incorporating expanded coverage for non-opioid pain management strategies, including acupuncture and integrative medicine approaches.[91] However, nationwide implementation of these changes remains slow, likely due to budget constraints, political and professional resistance, and policy inertia.

Provider Shortages and Geographic Disparities

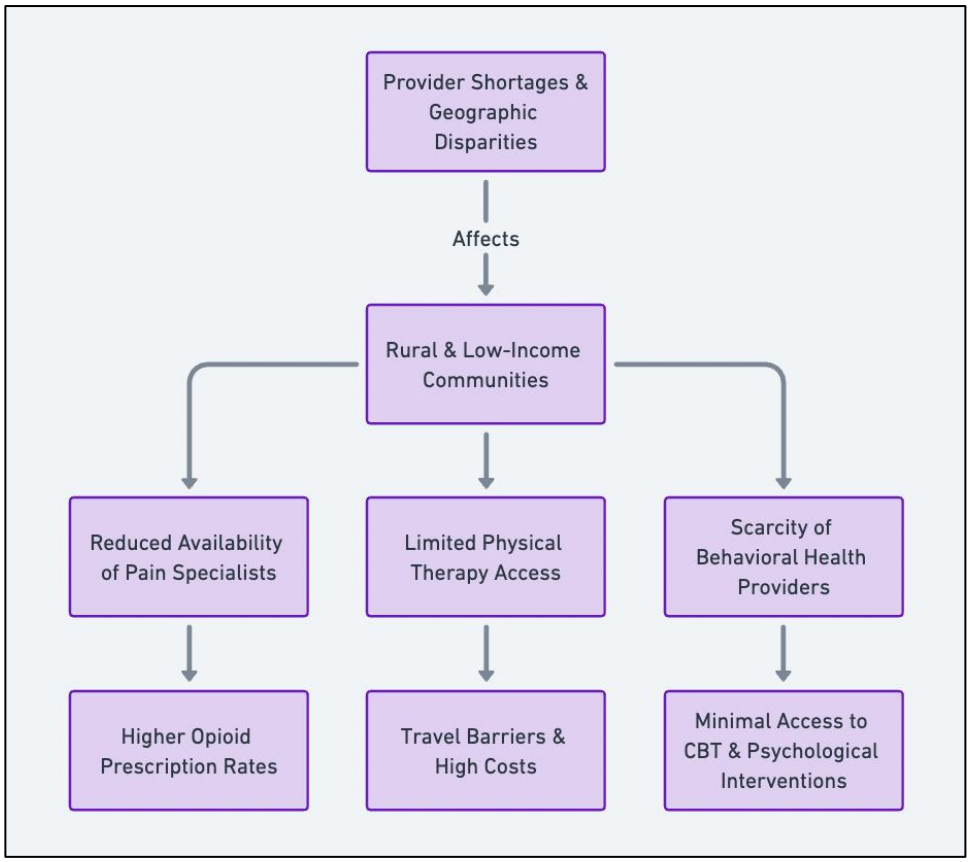
Provider Shortages & Geographic Disparities
Affects
Rural & Low-Income Communities
Reduced Availability of Pain Specialists
Limited Physical Therapy Access
Scarcity of Behavioral Health Providers
Higher Opioid Prescription Rates
Travel Barriers & High Costs
Minimal Access to CBT & Psychological Interventions

Figure 5. Effects of Provider Shortages and Geographic Disparities on Non-Opioid Pain Management Access

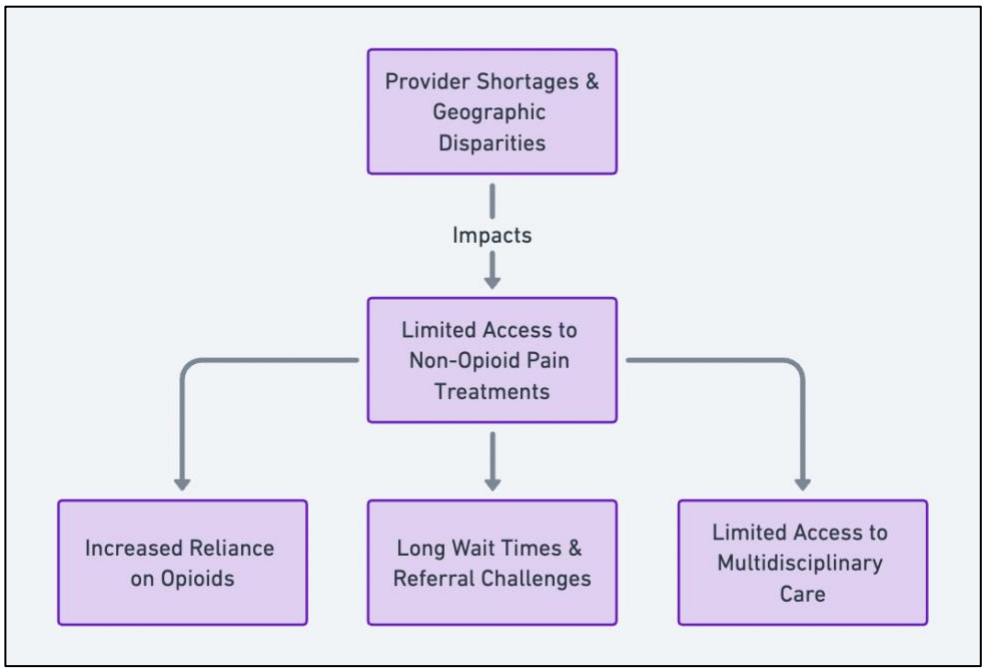
Provider Shortages & Geographic Disparities
Impacts
Limited Access to Non-Opioid Pain Treatments
Increased Reliance on Opioids
Long Wait Times & Referral Challenges
Limited Access to Multidisciplinary Care

Figure 6. Impacts of Provider Shortages and Geographic Disparities on Non-Opioid Pain Management Access

Access to non-opioid pain management treatments is critically dependent on the availability of qualified healthcare providers and the geographic distribution of healthcare resources. Therefore, provider shortages and geographic disparities create significant barriers for patients seeking non-opioid alternatives for chronic pain management.[92] These challenges disproportionately affect rural populations, low-income communities, and therefore Medicaid recipients,[93] often leaving opioids as the most accessible or only available pain treatment option. As the healthcare system seeks to reduce opioid dependence, addressing provider shortages and geographic disparities is essential for expanding access to safe and effective pain management strategies.

The shortage of healthcare providers trained in non-opioid pain management—including physical therapists, pain specialists, mental health professionals, and complementary medicine practitioners—significantly limits patient access to evidence-based treatments. According to the Association of American Medical Colleges (AAMC), the United States faces a projected shortage of 37,800 to 124,000 physicians by 2034, with pain management and physical medicine specialties among the most affected fields.[18] Additionally, there is a critical shortage of behavioral health providers, which limits access to CBT and other psychological interventions that are effective for chronic pain.[19] These provider shortages mean that patients often experience long appointment wait times, difficulty obtaining referrals, and limited access to multidisciplinary pain management approaches.[94] The National Institutes of Health's (NIH) National Center for Complementary and Integrative Health, for example, has found that Medicaid patients with chronic pain experience a median time from diagnosis to treatment nearly double that of privately insured patients.[95] This delay leads Medicaid patients to rely far less on specialty care providers, many of whom have more extensive training in non-opioid pain treatments, than non-Medicaid populations (17.4 percent versus 61.3 percent reliance, respectively).[95]

Geographic disparities further exacerbate inequities in pain management, particularly in rural and medically underserved areas where provider availability is already limited. Rural patients face unique challenges in accessing non-opioid pain management due to a lack of specialists, long travel distances to healthcare facilities, and limited public transportation options. A study published in *The Journal of Rural Health* found that rural patients with chronic pain were more likely to receive opioids than urban patients, likely due to the scarcity of non-opioid treatment options.[20] For example, access to physical therapy is highly limited in rural areas; rural areas in the U.S. experience 50 percent fewer physical therapists per 10,000 residents compared to urban areas, where availability is significantly higher.[21] This shortage forces patients in rural communities to either forgo treatment or travel long distances for care, which many cannot afford. Similarly, behavioral health providers who offer pain-focused cognitive therapies are concentrated in urban centers, leaving rural patients with few options beyond medication-based pain management.[22]

Telehealth has emerged as a promising solution to mitigate the impact of provider shortages and geographic disparities on non-opioid pain management. The expansion of telemedicine services during the COVID-19 pandemic demonstrated that virtual consultations with pain specialists, physical therapists, and behavioral health providers can significantly improve access to care, particularly for rural patients.[96] Additionally, patients with chronic pain who received telehealth-based MBSR or CBT reported similar pain reductions compared to those receiving in-person therapy.[97] Research on telerehabilitation programs for physical therapy have also showed that patients experienced significant improvements in pain relief and function, even when receiving care remotely.[98] However, barriers such as limited broadband access, reimbursement challenges, and state licensing restrictions continue to hinder the widespread adoption of telehealth solutions in rural areas.[99]

Several studies illustrate the consequences of provider shortages and geographic disparities on chronic pain management. One case study examined opioid prescribing trends in rural Appalachia, where healthcare provider shortages and limited access to physical therapy and behavioral health services contributed to an overreliance on opioids for pain management.[20] The study found, perhaps logically, that counties with the lowest availability of non-opioid treatment providers had the highest rates of opioid prescriptions and opioid-related overdoses. Another study evaluated a telehealth pain management program implemented in rural Montana. The program connected patients with physical therapists, pain psychologists, and rehabilitation specialists through virtual visits and resulted in a 30% reduction in opioid prescriptions among participants and significant improvements in pain management outcomes.[100]

The Heterogeneity of Medicaid Chronic Pain Populations

Medicaid beneficiaries with chronic pain are not a monolithic group; they vary significantly in age, the type and severity of their pain, comorbidities, socioeconomic status, and their ability to access non-opioid treatments. A one-size-fits-all approach to pain management will not adequately meet the needs of such a diverse population. To ensure equitable and effective policy implementation, it is essential to analyze the key subgroups within the Medicaid

chronic pain population, their unique challenges, and the policy considerations necessary to support them.

One of the largest subgroups consists of older adults with chronic pain and multiple comorbidities. Many of these individuals are dually eligible for Medicare and Medicaid and often suffer from musculoskeletal pain, such as osteoarthritis, as well as neuropathic pain from conditions like diabetes.[101] Managing their pain can be complicated by polypharmacy concerns, cognitive impairment, and limited mobility, which can make accessing physical therapy or behavioral interventions difficult.[101] Expanding home-based non-opioid treatments, increasing Medicaid reimbursement for non-opioid pharmacological options, and fostering integrated care models that connect primary care providers with pain specialists are therefore necessary steps to improve access for this group.

Another major subgroup includes low-income working-age adults with chronic pain. These individuals often experience pain related to work injuries, chronic back pain, or conditions like fibromyalgia.[102] Others may be unemployed due to their pain, exacerbating economic instability and access barriers. Medicaid must support this group by expanding coverage for workplace wellness programs, ensuring flexible access to non-opioid therapies outside of standard work hours, and providing patient education programs that promote early intervention before opioid dependence develops.

A distinct subgroup within the Medicaid chronic pain population consists of individuals already experiencing comorbid OUD and chronic pain. Many of these individuals may have developed OUD after being prescribed opioids for pain management, and now require alternative treatments that do not put them at risk of relapse. However, stigma in the healthcare system often leads to these patients being denied adequate pain care, and providers may be hesitant to prescribe even non-opioid pharmacological alternatives due to concerns about misuse.[103] Medicaid must integrate specialized pain management programs for this population within addiction treatment settings, expand access to behavioral therapies such as CBT and MBSR, and provide training for providers on treating pain in patients with a history of substance use disorder.

While chronic pain is more common in adults, pediatric and adolescent Medicaid beneficiaries also require consideration. Children and teenagers with conditions like juvenile arthritis, complex regional pain syndrome (CRPS), or chronic migraines often struggle to access non-opioid pain management due to Medicaid limitations on pediatric pain care.[104] It is also the case that many providers lack experience in treating pediatric chronic pain, leading to undertreatment or inappropriate opioid prescribing.[104] Medicaid policies should therefore expand reimbursement for pediatric pain specialists, fund school-based pain management programs, and promote early intervention strategies that prioritize non-opioid therapies before opioid-based treatments are considered.

Finally, a critical and often overlooked group consists of Medicaid beneficiaries for whom no therapy works—patients with intractable, treatment-resistant chronic pain. These individuals face an ongoing struggle to find relief, and if both opioid and non-opioid options fail, they may feel abandoned by the healthcare system; this group is at high risk for emotional distress and suicidal ideation.[105] Policymakers must ensure that Medicaid's transition toward non-opioid pain management does not leave these patients without options. Expanding coverage for palliative care approaches, funding access to behavioral therapies (CBT) and neuromodulation

techniques (TENS), often the only at-all functional treatments for these individuals,[105] and developing Medicaid-funded peer support programs can provide ongoing support and dignity for those living with severe, refractory pain.

By addressing the heterogeneity of the Medicaid chronic pain population, policymakers can design a framework that is not only effective but also equitable and responsive to the specific needs of different patient groups. Without such an approach, reforms risk exacerbating disparities and leaving vulnerable populations behind. This analysis highlights the importance of tailoring Medicaid policies to ensure that all beneficiaries—regardless of their age, geography, medical history, or treatment response—have access to meaningful pain relief without excessive reliance on opioids.

Prescription and Operationalization of Non-Opioid Therapies

An additional, significant challenge in shifting Medicaid's pain management approach away from opioids and toward non-opioid therapies is the disconnect between the clinicians prescribing these therapies and the providers responsible for delivering them. In many cases, the physician who diagnoses and prescribes non-opioid pain treatment is not the same provider who operationalizes it. As an example, while a primary care provider (PCP) or pain specialist may recognize the need for physical therapy, CBT, or acupuncture, they often lack the ability to directly provide these services within their practice.[106] Instead, they must refer the patient to external specialists, who may have limited availability, operate outside the Medicaid network, or require extensive administrative approval for reimbursement.[106] This fragmented approach creates multiple points of failure, where patients may face long wait times, logistical barriers, or outright denials of coverage.[106]

In contrast, opioids are often both prescribed and dispensed within the same clinical interaction. A patient in pain can see their PCP, receive an opioid prescription, and obtain their medication at a pharmacy immediately.[107] This ease of access makes opioids an attractive option for both patients and providers, even when a non-opioid intervention might be more appropriate. This disparity in workflow between prescribing an opioid and referring a patient to a non-opioid therapy likely contributes to the overuse of opioids within Medicaid populations.

To address this issue, Medicaid policies should promote integrated, interdisciplinary pain management models where non-opioid therapies are embedded into primary care settings or accessible through streamlined referral pathways. One promising, if not logistically challenging, approach is co-locating physical therapy, behavioral health services, and integrative medicine providers within primary care clinics, reducing barriers to access. Another, perhaps more actionable strategy is expanding Medicaid reimbursement for multidisciplinary pain management teams, ensuring that primary care physicians can easily coordinate care with specialists without administrative hurdles. Additionally, telehealth-based pain management services could play a crucial role in bridging the gap between prescription and operationalization, particularly for patients in rural or underserved areas.

By aligning the prescribing and delivery of non-opioid pain management services, Medicaid can reduce reliance on opioids while making alternative therapies a realistic, accessible, and provider-friendly option. Without addressing this fundamental issue, efforts to

expand non-opioid treatment coverage will continue to be underutilized, not because of a lack of clinical effectiveness, but because of structural inefficiencies in healthcare delivery.

The Role of Federal and State Policy in Expanding Access

State-Level Disparities in Non-Opioid Coverage

Federal and state policies play a critical role in determining access to non-opioid treatments for chronic pain. While federal initiatives have sought to encourage the adoption of non-opioid pain management strategies, state-level variations in Medicaid coverage and reimbursement policies have resulted in significant disparities in access. These disparities influence prescribing patterns, patient outcomes, and the overall effectiveness of efforts to reduce opioid dependence.

At the federal level, several policies have been introduced to promote the use of non-opioid treatments for chronic pain. The *SUPPORT for Patients and Communities Act* (2018) directed the Centers for Medicare & Medicaid Services (CMS) to evaluate and expand coverage for non-opioid pain management options.[108] This led to increased reimbursement for physical therapy, CBT, and acupuncture under Medicare, but Medicaid policies remained subject to state-level decision-making.[108] Additionally, the National Institutes of Health (NIH) *Helping to End Addiction Long-Term (HEAL) Initiative* has funded research into non-opioid treatments, supporting efforts to integrate these therapies into clinical practice.[109] However, these federal actions have not been uniformly implemented at the state level, leading to significant disparities in Medicaid coverage.

Geographic disparities compound these challenges. Rural states, where healthcare provider shortages are already a concern, often have more restrictive Medicaid policies regarding non-opioid treatments.[110] Rural patients themselves are also less likely to engage in non-opioid forms of treatment, like PT and behavioral interventions, due to geographic isolation.[22] Many states have attempted to expand treatment access through telehealth, but Medicaid reimbursement for telehealth-based pain management remains inconsistent across both states and telehealth modalities (audio-only, remote patient monitoring, etc.),[111] limiting its effectiveness in addressing geographic disparities.

The disparities in non-opioid treatment coverage at the state level reflect broader inconsistencies in how pain management is approached across the U.S. While federal policies (*SUPPORT for Patients and Communities Act, HEAL Initiative*) and recommendations (CMS, CDC) have encouraged the expansion of non-opioid treatment options, the lack of uniform Medicaid coverage means that access remains highly variable depending on where a patient lives.

Table 1. Summary of Barriers to Non-Opioid Chronic Pain Management

Key Issue	Description	Consequences	Potential Solutions
Restrictive Medicaid Reimbursement Policies	Medicaid policies limit access to non-opioid pain management due to stringent requirements like prior authorization, session limits, and cost-sharing. This leads to an over-reliance on opioids, as they have fewer restrictions.	Medicaid patients are more likely to receive opioids due to limited access to alternatives, leading to higher rates of opioid use disorder (OUD).	Reform Medicaid reimbursement to include comprehensive coverage for non-opioid treatments and reduce administrative burdens.
Provider Shortages and Geographic Disparities	Shortages of pain management specialists, physical therapists, and behavioral health providers, especially in rural areas, limit access to non-opioid treatments. Patients face long wait times, travel burdens, and limited referral options.	Rural and underserved populations disproportionately rely on opioids due to lack of access to alternative treatments.	Increase investment in non-opioid provider training, expand telehealth, and address workforce shortages in rural areas.
State-Level Disparities in Non-Opioid Coverage	Medicaid reimbursement for non-opioid treatments varies widely by state. Some states provide comprehensive coverage, while others impose strict limitations, affecting access to treatments like CBT, acupuncture, and physical therapy.	Patients in restrictive states face greater barriers to accessing evidence-based, non-opioid pain management strategies.	Establish federal guidelines for Medicaid reimbursement of non-opioid treatments to reduce state-level disparities.

Policy Incentives to Promote Non-Opioid Treatments

As the opioid epidemic continues to strain healthcare systems, policymakers have increasingly sought to promote non-opioid treatments for chronic pain management. A range of policy incentives—spanning financial, regulatory, and educational measures—have been introduced to encourage the adoption of non-opioid interventions, including but not limited to physical therapy, CBT, and integrative medicine. However, the effectiveness of these incentives depends on a broader set of economic, social, and regulatory factors that shape healthcare decision-making. By employing a PESTEL (Political, Economic, Social, Technological, Environmental, and Legal) analysis, this paper hopes to provide policymakers with a better understanding of the external forces influencing non-opioid treatment adoption.

Table 2. PESTEL Analysis of Policy Incentives for Non-Opioid Pain Treatments

Factor	Description	Challenges
Political	Legislative efforts, such as the *SUPPORT Act*, aim to expand coverage for non-opioid treatments.[108] Progressive states are more likely to adopt expansive Medicaid policies.[86,112]	Political resistance from industry stakeholders and ideological differences among states create disparities in Medicaid coverage for non-opioid treatments.[86,112,113]
Economic	Non-opioid treatments have higher upfront costs, limiting adoption.[114] Policy incentives like increased reimbursement rates and grants attempt to offset these costs, but financial incentives for providers remain insufficient.[56,115,116]	Lack of financial incentives for providers and high upfront costs deter adoption despite federal reimbursement policies and grants.[56]
Social	Societal attitudes normalize opioid prescribing, especially in underserved communities.[117] Efforts like provider education, awareness campaigns, and shared decision-making initiatives aim to increase acceptance of non-opioid options.[72]	Cost and accessibility barriers persist, particularly for lower-income populations, limiting the impact of awareness and education campaigns.[117]
Technological	Telehealth expansion, in which there is policy interest, improves access to non-opioid treatments, particularly in rural areas.[96–98] However, broadband access and digital literacy disparities hinder widespread adoption.[118]	Telehealth is promising, but disparities in broadband access, digital literacy, and Medicaid reimbursement policies restrict its effectiveness.[118]
Environmental	Geographic accessibility and infrastructure affect non-opioid treatment availability. Efforts to integrate treatments into primary care and invest in transportation assistance exist,[119,120] but rural provider shortages remain a significant barrier.[30,121]	Rural areas face provider shortages and limited Medicaid reimbursement for transportation, further restricting access to non-opioid treatments.[30,121]
Legal	State-level regulations, such as restrictions on opioid prescribing and mandatory continuing education, promote non-opioid treatments.[122–124] However, inconsistencies in Medicaid policies lead to uneven access across states.[125]	Legal inconsistencies across states lead to uneven implementation of non-opioid treatment policies, despite federal-level efforts.[125]

Policy incentives to promote non-opioid treatments for chronic pain must account for a range of external influences, as highlighted by the above PESTEL analysis; political, economic, and social factors shape the extent to which non-opioid treatments are integrated into routine care, while technological, environmental, and legal considerations influence accessibility and implementation. While policy incentives such as expanded Medicaid coverage, provider education, and telehealth reimbursement have improved access to non-opioid pain management options, disparities remain, particularly at the state level. Understanding these challenges through PESTEL analysis provides a comprehensive view of the complex policy landscape surrounding non-opioid treatments for chronic pain.

Section Conclusion

The findings presented in this section illustrate both the efficacy of non-opioid treatments for chronic pain and the structural challenges that hinder their widespread adoption. Physical therapy, acupuncture, non-opioid pharmaceutical interventions, and behavioral therapies have all demonstrated effectiveness in reducing pain severity and improving function while simultaneously lowering opioid consumption. However, restrictive Medicaid reimbursement policies, provider shortages, and geographic disparities continue to limit access to these evidence-based treatments, particularly for low-income and rural populations. While federal and state policies have attempted to address these disparities, significant variation in Medicaid coverage across states has resulted in inconsistent access to non-opioid pain management options. Policy incentives aimed at promoting non-opioid treatments must account for the complex interplay of political, economic, social, technological, environmental, and legal factors that shape healthcare decision-making. Addressing these challenges through targeted policy interventions will be critical in expanding access to non-opioid chronic pain treatments, reducing opioid reliance, and improving pain management outcomes nationwide.

Recommendations

Expanding non-opioid pain management for Medicaid populations presents significant opportunities to reduce opioid dependency, improve patient outcomes, and mitigate disparities in healthcare access. However, these reforms also face substantial challenges, including provider shortages, financial constraints, administrative barriers, and political resistance at both state and federal levels. While existing research supports the effectiveness of non-opioid treatments in reducing chronic pain and opioid use, large-scale implementation remains uncertain due to variability in state Medicaid policies, cost sustainability, and provider adoption.

The following recommendations are structured to provide a clear, evidence-based framework for Medicaid reform, incorporating the Chronic Care Model (CCM) to ensure interdisciplinary, patient-centered care and the CMS Framework for Health Equity Priorities to ensure that access to effective pain management is not limited by geographic, racial, or socioeconomic disparities. This approach leverages real-world pilot programs, economic incentives, policy standardization, and data-driven decision-making to establish a scalable, sustainable solution.

Table 3. Summary of Recommendations for Non-opioid Chronic Pain Treatment in Medicaid

Recommendation	Description	Key Policy Actions	Expected Impact	Potential Risks	Mitigation Strategies
Implement a Medicaid Chronic Pain Management Program Using the Chronic Care Model (CCM)	Integrate a team-based, long-term approach for chronic pain management into Medicaid, replacing the current reactive opioid prescribing model.	1. Fund interdisciplinary pain management teams. 2. Expand patient self-management education. 3. Require multidisciplinary care coordination. 4. Establish teleconsultation networks. 5. Create centralized pain management registries. 6. Partner with community providers.	Reduces opioid dependence, improves patient outcomes, and lowers healthcare costs.	Provider shortages, financial constraints, and political resistance.	Leverage federal funding and pilot programs to demonstrate effectiveness before broad implementation.
Establish a Coalition of Willing States to Pilot Medicaid Non-Opioid Reforms	Create a multi-state coalition to test non-opioid pain management reforms before nationwide expansion.	1. Select diverse states (early adopters, high opioid mortality, bipartisan interest). 2. Expand Medicaid coverage for PT, CBT, acupuncture, and non-opioid pharmacology. 3. Establish interdisciplinary pain management networks. 4. Standardize evaluation frameworks for policy assessment.	Provides evidence-driven policy insights, reduces opioid use, and promotes bipartisan support for future expansion.	Budget constraints, political opposition, and inconsistent policy implementation.	Offer financial incentives (FMAP increases) and establish standardized evaluation criteria to ensure comparability across states.
Expand Medicaid Reimbursement and Financial Incentives for Non-Opioid Pain Management	Correct financial disincentives that make opioids a cheaper and more accessible pain management option than non-opioid treatments.	1. Increase FMAP match rates for states adopting non-opioid pain management. 2. Eliminate prior authorization for PT, acupuncture, and behavioral health.	Encourages provider adoption of non-opioid treatments, increases patient access, and reduces long-term	Higher federal expenditures and provider resistance to shifting treatment models.	Pilot increased reimbursement rates in coalition states and provide training programs for providers.

		3. Raise reimbursement rates for non-opioid treatments. 4. Create a Medicaid Pain Management Innovation Fund.	opioid dependency.		
Center Health Equity in Medicaid's Pain Management Policies	Ensure equitable access to non-opioid pain management by addressing geographic, racial, and socioeconomic disparities.	1. Expand funding for non-opioid pain management in rural/underserved areas. 2. Standardize Medicaid coverage for core non-opioid treatments nationwide. 3. Develop culturally competent training programs for Medicaid providers.	Reduces racial and geographic disparities in pain management, increases access for underserved populations.	Federal funding challenges and state resistance to standardizing Medicaid policies.	Tie Medicaid expansion funds to existing federal programs (IHS, HRSA) and use FMAP increases as an incentive for compliance.
Strengthen Federal Oversight and Data Collection for Evidence-Based Medicaid Reform	Develop a national Medicaid pain management data-sharing initiative to track the impact of non-opioid reforms.	1. Monitor non-opioid treatment utilization rates. 2. Track opioid prescribing trends by region and provider type. 3. Collect patient-reported outcomes on pain reduction and function. 4. Assess cost-effectiveness of non-opioid treatments vs. opioid-related expenditures. 5. Identify disparities in treatment access.	Ensures data-driven Medicaid policy adjustments, improves transparency, and demonstrates cost-effectiveness.	State resistance to federal oversight and privacy concerns related to patient data collection.	Integrate tracking into existing CMS Medicaid reporting structures and use de-identified, aggregated data to protect patient privacy.

1. Implement a Medicaid Chronic Pain Management Program Using the Chronic Care Model

Chronic pain, like other chronic conditions such as diabetes and hypertension, requires proactive, team-based, and long-term management rather than the reactive, short-term model currently dominant in Medicaid. To address this, Medicaid should establish a Chronic Pain Management Program (CPMP) that fully integrates all components of the Chronic Care Model (CCM).

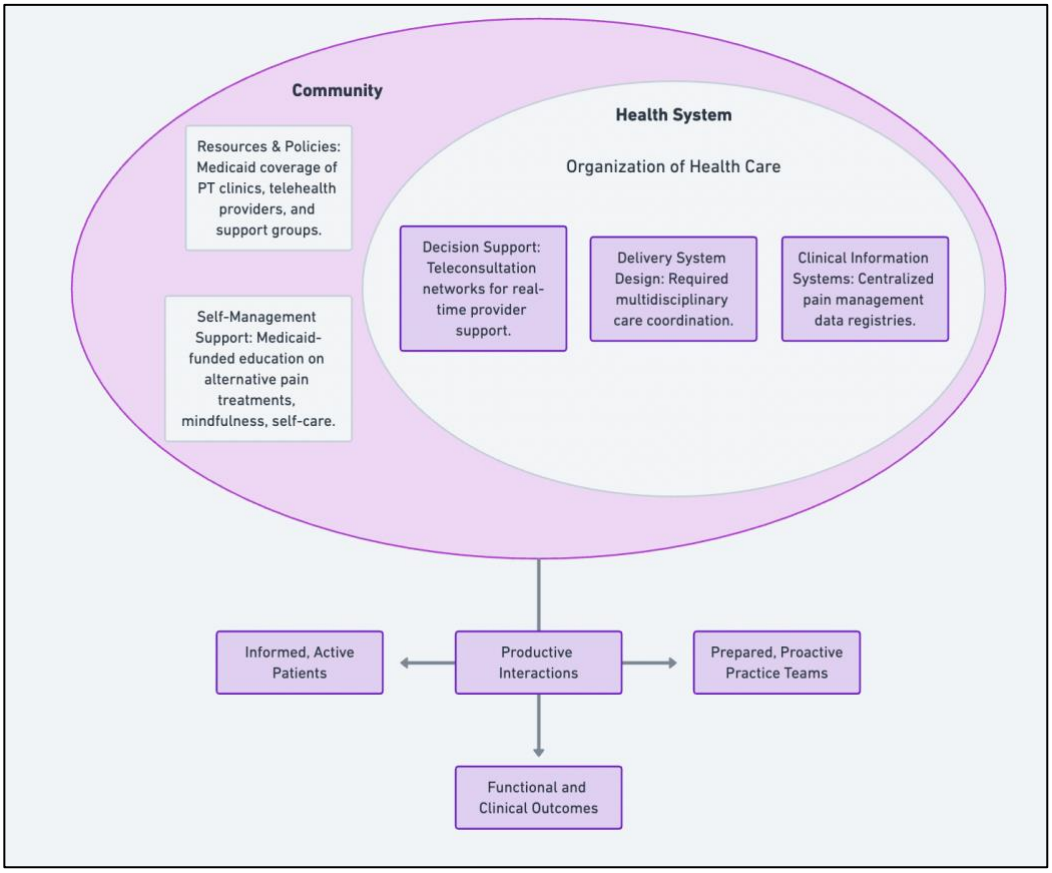
Community
Resources & Policies: Medicaid coverage of PT clinics, telehealth providers, and support groups.
Self-Management Support: Medicaid-funded education on alternative pain treatments, mindfulness, self-care.
Health System
Organization of Health Care
Decision Support: Teleconsultation networks for real-time provider support.
Delivery System Design: Required multidisciplinary care coordination.
Clinical Information Systems: Centralized pain management data registries.
Informed, Active Patients
Productive Interactions
Prepared, Proactive Practice Teams
Functional and Clinical Outcomes

Figure 7. Chronic Care Model Adapted to Policy Framework

The following is a numbered elaboration regarding components of the proposed framework that should align with the properties of the CCM.

1. Health System Organization: Medicaid should fund the development of interdisciplinary pain management teams that connect primary care providers, specialists, and physical therapists.
2. Self-Management Support: Patients should receive Medicaid-funded education on alternative pain treatments, including lifestyle modifications, mindfulness, and self-care techniques.
3. Delivery System Design: Medicaid should require multidisciplinary care coordination, ensuring chronic pain is managed holistically rather than episodically.
4. Decision Support: Medicaid should fund teleconsultation networks where primary care providers can consult pain management specialists in real time.

5. Clinical Information Systems: States should implement centralized pain management data registries, tracking opioid prescribing rates, patient outcomes, and cost-effectiveness.
6. Community Resources & Policies: Medicaid should partner with physical therapy clinics, telehealth providers, and community pain support groups, ensuring rural and underserved populations have access to care. This involves ensuring that all included providers are able to administer effective and coordinated care.

By integrating CCM principles into Medicaid, these reforms will work to reduce opioid dependence, improve long-term patient outcomes, and lower overall healthcare costs, making pain management more sustainable and equitable.

2. Establish a Coalition of Willing States to Pilot Medicaid Non-Opioid Reforms

Implementing a federal mandate requiring all Medicaid programs to cover comprehensive non-opioid pain treatments is politically and logistically challenging. Instead, a coalition of willing states should serve as early adopters, testing and refining Medicaid non-opioid pain management reforms before nationwide expansion. This approach ensures that policy changes are evidence-driven and adaptable, reducing the risk of unintended consequences or inefficient spending.

State Selection Criteria and Strategic Rationale

The coalition should include a diverse mix of states to maximize geographic, political, and demographic representation, ensuring that pilot programs generate insights applicable across the nation.

- Early adopters with existing leadership in Medicaid pain management**:** States like Vermont and Oregon already provide broader Medicaid coverage for alternative pain treatments such as acupuncture, chiropractic care, and behavioral therapies.[126,127] Their existing infrastructure makes them ideal test cases for policy refinement.
- States with high opioid mortality rates and incentive to reform: Kentucky, West Virginia, and Ohio have some of the highest opioid overdose rates in the country, with West Virginia alone experiencing an opioid-involved overdose death rate of a calculated 67.6 per 100,000 residents in 2021—more than twice the national average.[128–130] These states have strong incentives to explore alternative pain management strategies.
- Politically diverse states: The incorporation of the above five states—representing a range of partisan representation—additionally demonstrates that a desire to address the opioid epidemic via the provision of non-opioid treatment alternatives for chronic pain is not a partisan issue, increasing the likelihood of broad federal adoption in the future.

Implementation Strategy and Expected Impact

Each participating state would be required to expand Medicaid coverage for a core set of non-opioid pain treatments, including:

- Physical therapy (PT), which has been shown to both reduce pain intensity and opioid use long-term by at least 10 percent when used as a first-line treatment for chronic pain.[16]
- Cognitive behavioral therapy (CBT), which has been found to significantly reduce pain intensity, improve physical function, and decrease depressive symptoms in patients with chronic pain.[81]
- Acupuncture, which provides significant pain relief for chronic back and neck pain, osteoarthritis, migraines, and shoulder pain,[70] as well as reduces opioid consumption by 21-29 percent compared to those receiving usual care.[71,72]
- Non-opioid pharmacological options, including NSAIDs, antidepressants, and anticonvulsants, which have been proven effective in managing various types of chronic pain.

The coalition would establish interdisciplinary pain management networks, integrating primary care providers, pain specialists, behavioral health professionals, and physical therapists to ensure team-based, coordinated care. This aligns with the CCM's emphasis on integrated healthcare systems, reducing fragmentation in pain management and ensuring continuity of care.

Recommendation-Specific Risks and Mitigation Strategies

- Risk: Some states may refuse to participate due to budget constraints or political opposition.
    - Mitigation: The federal government should provide financial incentives, such as increased Medicaid FMAP match rates, to encourage participation.
- Risk: Variability in state Medicaid administration may lead to inconsistent policy implementation.
    - Mitigation: The coalition should establish a standardized evaluation framework, ensuring that outcome data is comparable across states.

3. Expand Medicaid Reimbursement and Financial Incentives for Non-Opioid Pain Management

Current Medicaid reimbursement structures create strong financial disincentives for non-opioid pain management. Opioid prescriptions are cheap, easy to prescribe, and fully reimbursed by Medicaid, while non-opioid treatments require complex prior authorizations, receive lower reimbursement rates, or are not covered at all. As a result, many providers default to opioid prescriptions rather than exploring alternative pain treatments.

Recommendation-Specific Policy Recommendations

To correct this imbalance, CMS should implement the following financial reforms:

- Increase FMAP match rates (by 5-10 percent) for states that integrate non-opioid pain management into Medicaid coverage. This would reduce state budgetary concerns and encourage broader adoption.

- Eliminate prior authorization requirements for physical therapy, acupuncture, and behavioral health interventions, removing administrative barriers that delay or prevent access to care.
- Raise reimbursement rates for non-opioid pain treatments, ensuring that providers are adequately compensated for offering alternative pain management services.
- Establish a Medicaid Pain Management Innovation Fund, which would offer grants to providers who integrate non-opioid therapies into their practice, helping cover startup costs and training expenses.

Evidence and Expected Impact

These financial incentives align with the Health System Organization component of the Chronic Care Model, which emphasizes structural changes to align reimbursement policies with best practices.

Generally, it is the case that increasing Medicaid reimbursement concurrently increases the probability that an enrollee receives care from a provider.[131] Therefore, an increased FMAP match rate is critical for the optimal adoption of non-opioid chronic pain treatment modalities by providers.

Recommendation-Specific Risks and Mitigation Strategies

- Risk: Higher FMAP match rates increase federal expenditures, which may face political opposition.
    - Mitigation: Pilot increased reimbursement rates in coalition states first, gathering data on cost-effectiveness before broader expansion.
- Risk: Some providers may resist transitioning from opioids to non-opioid treatments due to lack of familiarity or training.
    - Mitigation: Medicaid should provide provider education grants and training programs to ensure widespread adoption.

4. Center Health Equity in Medicaid's Pain Management Policies

Despite the growing recognition of non-opioid treatments, low-income, rural, and minority populations face disproportionate barriers to accessing alternative pain management options. Geographic availability, provider shortages, and structural biases in healthcare delivery contribute to widespread disparities in pain treatment, with Black, Indigenous, and People of Color (BIPOC) patients receiving less pain medication and fewer non-opioid treatment referrals compared to white patients.[132]

Recommendation-Specific Policy Recommendations

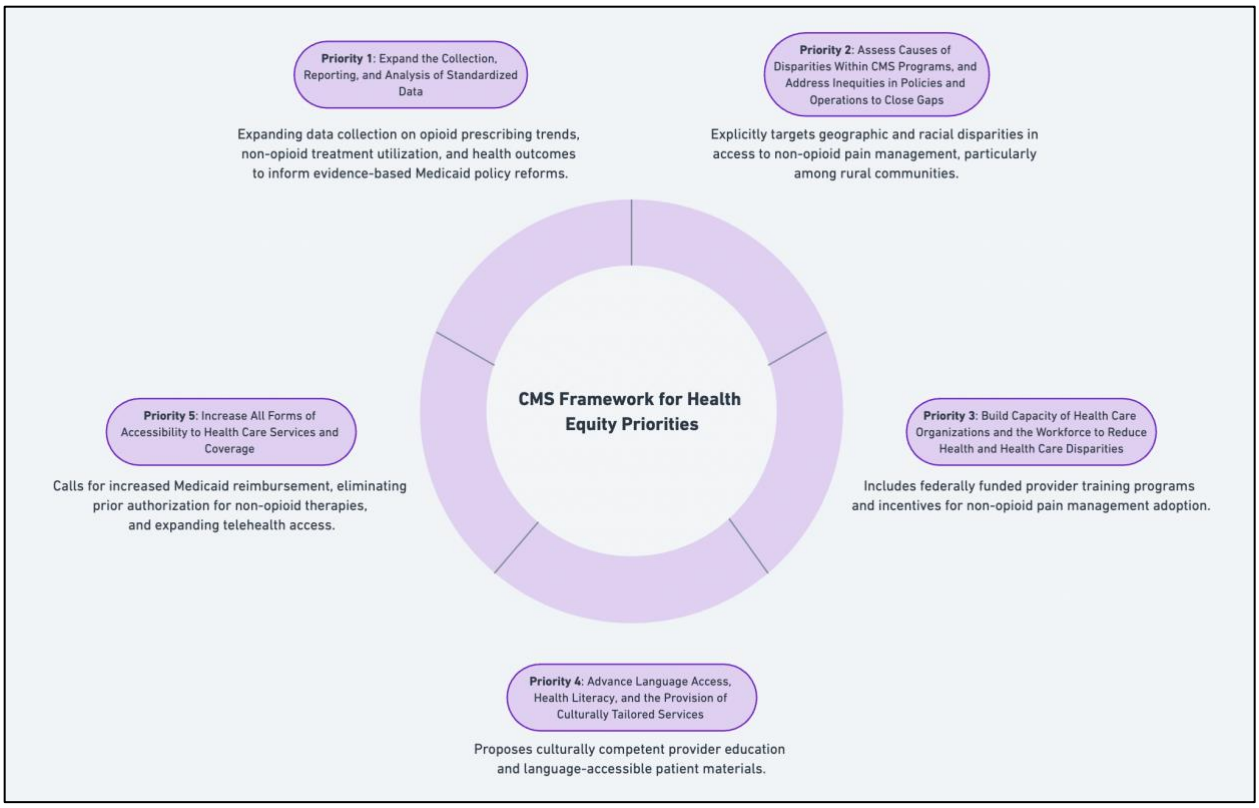
Priority 1: Expand the Collection, Reporting, and Analysis of Standardized Data
Expanding data collection on opioid prescribing trends, non-opioid treatment utilization, and health outcomes to inform evidence-based Medicaid policy reforms.
Priority 2: Assess Causes of Disparities Within CMS Programs, and Address Inequities in Policies and Operations to Close Gaps
Explicitly targets geographic and racial disparities in access to non-opioid pain management, particularly among rural communities.
CMS Framework for Health Equity Priorities
Priority 5: Increase All Forms of Accessibility to Health Care Services and Coverage
Calls for increased Medicaid reimbursement, eliminating prior authorization for non-opioid therapies, and expanding telehealth access.
Priority 3: Build Capacity of Health Care Organizations and the Workforce to Reduce Health and Health Care Disparities
Includes federally funded provider training programs and incentives for non-opioid pain management adoption.
Priority 4: Advance Language Access, Health Literacy, and the Provision of Culturally Tailored Services
Proposes culturally competent provider education and language-accessible patient materials.

Figure 8. CMS Framework for Health Equity Priorities Adapted to Policy Framework

To ensure that Medicaid's non-opioid pain management reforms reduce rather than reinforce existing health disparities, the following steps should be taken in line with the CMS Framework for Health Equity Priorities:

1. Expand federal funding for non-opioid pain management services in rural and underserved areas by allocating Medicaid-specific grants to:
    - Federally Qualified Health Centers (FQHCs) and Rural Health Clinics (RHCs) to provide on-site physical therapy, behavioral health therapy, and integrative pain care.
    - Indian Health Service (IHS) facilities to establish telehealth pain management networks that serve tribal communities with historically limited access to alternative treatments.
2. Standardize Medicaid coverage requirements across states to prevent low-income, rural, and minority populations from disproportionately lacking access to non-opioid pain treatments due to restrictive state policies.
    - Medicaid should require all states to cover a core set of non-opioid treatments (physical therapy, behavioral therapy, acupuncture, and non-opioid pharmacology), ensuring equal access regardless of geography or state discretion.

3. Develop culturally competent pain management training programs for Medicaid providers to:
    - Address implicit biases in pain assessment and treatment recommendations.
    - Encourage culturally relevant pain management strategies, particularly for Native American, Hispanic, and Black populations, who have historically faced undertreatment for pain.
    - Provide language-accessible educational materials on non-opioid pain management options, ensuring that patients with limited English proficiency receive clear and informed care guidance.

Evidence and Expected Impact

These recommendations align with the CMS Framework for Health Equity Priorities, ensuring that Medicaid's pain management strategy does not perpetuate existing racial, geographic, and economic disparities.

- Studies show, for example, that Black patients are 22 percent less likely than white patients to receive any form of pain medication or treatment for the same reported pain levels in emergency departments.[133] Addressing these disparities requires structural Medicaid policy changes, not just provider-level interventions.
- Telehealth pain management programs reduce rural treatment disparities by promoting ease of outreach to more geographically isolated populations.[134]

Recommendation-Specific Risks and Mitigation Strategies

- Risk: Expanding Medicaid grants for FQHCs, RHCs, and IHS facilities requires additional federal funding, which may face resistance.
    - Mitigation: Tying Medicaid expansion funds to existing programs (such as IHS and HRSA rural health funding) can help reduce political barriers to increased appropriations.
- Risk: Some states may resist federal coverage standardization.
    - Mitigation: Tying FMAP increases to compliance with coverage requirements provides an incentive for states to adopt reforms without imposing unfunded mandates.

5. Strengthen Federal Oversight and Data Collection for Evidence-Based Medicaid Reform

Expanding Medicaid's coverage of non-opioid pain management requires rigorous, ongoing evaluation to ensure that reforms are cost-effective, sustainable, and equitable. Without strong federal oversight and standardized data collection, it will be difficult to measure the long-term success of these reforms or adjust policies based on real-world outcomes.

Recommendation-Specific Policy Recommendations

To ensure evidence-based decision-making, CMS should establish a national Medicaid pain management data-sharing initiative that tracks:

1. Utilization rates of non-opioid pain treatments (physical therapy, CBT, acupuncture, etc.) across states and demographics.
2. Opioid prescribing trends by provider type, geographic region, and racial demographics to track reductions in opioid dependence and potential disparities.
3. Patient-reported outcomes on pain reduction, function, and quality of life to assess the effectiveness of Medicaid-covered non-opioid treatments.
4. Cost-effectiveness metrics, comparing Medicaid spending on non-opioid treatments versus opioid-related costs (including overdose treatment, addiction services, and emergency room visits).
5. Disparities in treatment access, ensuring that non-opioid pain treatments reach underserved populations rather than remaining concentrated in urban or wealthier Medicaid subgroups.

Evidence and Expected Impact

A national Medicaid data-sharing initiative would align with the Clinical Information Systems component of the Chronic Care Model (CCM), ensuring that policy adjustments are based on real-time, standardized data rather than anecdotal evidence or political pressures.

- States that implemented opioid-focused prescription drug monitoring programs (PDMPs) experienced a nearly 10 percent decrease in opioid prescriptions per 1,000 Medicaid enrollees per quarter, a 9.6 percent reduction in opioid-related inpatient stays per quarter per 100,000 enrollees, and a nearly 20 percent reduction in opioid-related emergency department visits per quarter per 100,000 enrollees.[135] These collectively save an estimated $155 million in Medicaid spending annually.[135]

Recommendation-Specific Risks and Mitigation Strategies

- Risk: States may resist increased federal oversight, particularly if they view standardized data collection as federal overreach.
    - Mitigation: Incorporating pain management tracking into existing CMS Medicaid reporting structures (such as the Medicaid & CHIP Scorecard) can reduce administrative burden while still improving transparency.
- Risk: Privacy concerns related to patient data collection and sharing.
    - Mitigation: Using de-identified, aggregated data can ensure that patient privacy is protected while still allowing meaningful analysis of trends and disparities.

Section Conclusion: A Path Toward Systemic Medicaid Reform

The expansion of Medicaid's non-opioid pain management coverage represents a transformative shift in how chronic pain is treated in the U.S. healthcare system. By leveraging a coalition of willing states to test and refine best practices, restructuring financial incentives to

support interdisciplinary pain care, integrating the Chronic Care Model (CCM) into Medicaid's approach, and implementing strong federal oversight and equity measures, this policy framework ensures that reforms are both scalable and sustainable.

However, systemic change must be implemented gradually and strategically, recognizing the financial, political, and logistical barriers to reform. A phased approach—beginning with targeted state-led pilots and voluntary adoption incentives—will help mitigate risks, build stakeholder support, and refine policies based on real-world evidence.

Ultimately, expanding access to non-opioid pain management will not only reduce opioid dependence but also improve overall patient outcomes, lower long-term healthcare costs, and reduce disparities in pain treatment access, ensuring that Medicaid beneficiaries receive the care they need without reliance on addictive medications. By integrating evidence-based policies with a pragmatic implementation strategy, these reforms will provide a sustainable, equitable solution to one of the most pressing public health challenges of our time.

Implementation

Implementing a federally guided, state-administered framework for non-opioid chronic pain management in Medicaid populations requires a phased approach that accounts for policy development, regulatory approval, coalition-building, state-level implementation, and long-term monitoring. Given the complexity of Medicaid reforms, this framework will be implemented in five key phases: (1) development and approval, (2) coalition formation and pilot implementation, (3) state integration and provider incentives, (4) national expansion and federal oversight, and (5) long-term monitoring and policy refinement.

To follow is a detailed elaboration of specific phase elements.

Phase 1: Development and Approval (Months 1–24)

The first phase will focus on developing the policy framework, securing regulatory approval, and ensuring alignment with existing Medicaid structures. The Centers for Medicare & Medicaid Services (CMS) will lead this effort, collaborating with public health experts, Medicaid directors, and key stakeholders to draft the new federal Medicaid guidelines requiring states to include non-opioid chronic pain management as a core benefit.

For this policy to take effect, CMS must navigate the regulatory rulemaking process. Typically, Medicaid policy changes are enacted through either CMS-issued regulations (via the Federal Register's notice-and-comment process) or statutory amendments (via congressional action and the Government Accountability Office (GAO)).[136] Based on precedent, CMS rulemaking can take 12–24 months from initial drafting to finalization, depending on stakeholder input, public comments, and administrative review. For example, the implementation of Medicaid's Home and Community-Based Services (HCBS) rule took roughly 20 months from its proposal to the final rule publication.[137] The timeline for non-opioid coverage reform will likely align with these precedents, requiring significant administrative coordination.

During this phase, CMS should also develop financial models for increased Federal Medical Assistance Percentage (FMAP) rates to incentivize state participation and outline a standardized framework for measuring program outcomes; likely candidate measures include

reductions in opioid prescriptions, opioid use disorder (OUD)-related complications or mortality, and associated healthcare costs. Early engagement with congressional committees overseeing Medicaid funding will be crucial to ensure that adequate financial resources are allocated.

Phase 2: Coalition of the Willing and Pilot Implementation (Months 24–48)

Given the challenges of nationwide Medicaid reform, an initial coalition of willing states should serve as early adopters, piloting non-opioid pain management initiatives before broader implementation. This coalition will include the states of Vermont, Oregon, Kentucky, West Virginia, and Ohio; these states consist of those with leadership in Medicaid innovation a priori—the former two—as well as those with high opioid-related mortality rates and expressed interest in engaging with OUD reduction-related interventions.

To encourage participation, the federal government should offer increased FMAP matching rates to coalition states that integrate non-opioid pain management into their Medicaid benefits. Additionally, CMS should establish a competitive federal grant program to assist these states in developing provider networks, telehealth capabilities, and infrastructure improvements necessary for implementation.

Each participating state should be required to expand Medicaid coverage for core non-opioid pain treatments, including physical therapy, cognitive-behavioral therapy (CBT), acupuncture, and non-opioid pharmacological alternatives. Pilot states should also work to implement interdisciplinary pain management networks per the rule drafted in Phase One, integrating primary care providers, pain specialists, behavioral health professionals, and physical therapists to ensure coordinated, team-based care.

To assess impact, CMS should require coalition states to submit quarterly reports detailing program outcomes, opioid prescribing trends, and cost savings associated with non-opioid alternatives. Lessons learned from the coalition will inform broader federal implementation, allowing CMS to refine policy requirements before national expansion.

Phase 3: State Integration and Provider Incentives (Months 48–72)

Following any demonstrated success in the coalition states, CMS should initiate the broader integration of non-opioid pain management into state Medicaid programs nationwide. Rather than mandating Medicaid State Plan Amendments (SPAs), which could provoke significant political resistance, CMS will instead use enhanced Federal Medical Assistance Percentage (FMAP) incentives as the primary mechanism for encouraging state adoption. States that expand access to non-opioid treatments will receive an increased FMAP match rate, reducing their financial burden while maintaining flexibility in how they implement coverage expansions.

To further support adoption, CMS should offer competitive grants to help states build provider networks, expand telehealth capabilities, and invest in infrastructure to support non-opioid pain management. Additionally, financial incentives should be introduced to encourage provider participation, including higher reimbursement rates for non-opioid therapies, the elimination of prior authorization requirements, and CME training grants to ensure providers are well-equipped to deliver evidence-based non-opioid treatments. While this voluntary, incentive-

driven approach respects state autonomy, the financial benefits of participation—coupled with demonstrated success from coalition states—should be expected to drive widespread adoption; the success of this form of federally supported financial incentivization can be seen with Medicaid expansion under the ACA in 2014.[138]

While rapid integration will increase early access to non-opioid treatments, it may place an administrative burden on state Medicaid agencies. To mitigate this, CMS should provide phased-in compliance deadlines and financial support for state Medicaid offices facing implementation challenges.

Phase 4: National Expansion and Federal Oversight (Months 72 and Beyond)

Once adoptive states have demonstrated sustained reductions in opioid prescriptions, opioid use disorder (OUD)-related complications, and Medicaid expenditures related to opioid-related treatments, CMS should shift its focus to expanding participation and strengthening federal oversight. While some states may have already opted into the program due to FMAP incentives, others may require additional support or targeted policy adjustments to encourage adoption.

To ensure accountability and transparency, CMS will establish a national framework for evaluating state performance. This should include annual state performance evaluations tracking opioid prescribing trends, non-opioid utilization, and patient health outcomes. A Medicaid Pain Management Dashboard should be developed to publicly track progress, highlight best practices, and identify states lagging in implementation. Additionally, CMS should continue to offer FMAP adjustments and grant funding to further incentivize adoption, with priority given to states demonstrating success in reducing opioid reliance through non-opioid treatments.

At the federal level, legislative advocacy may be necessary to ensure sustained funding and long-term program viability. CMS and state Medicaid agencies should work with Congress and the GAO to explore policy options, including embedding non-opioid pain management funding into broader Medicaid modernization initiatives. While this phase does not assume universal state participation, it establishes a structured pathway for continued expansion, ensuring that non-opioid treatment options remain a viable and attractive alternative for Medicaid programs nationwide.

Phase 5: Long-Term Monitoring and Policy Refinement (Throughout)

This phase of implementation, occurring throughout the policy process, should focus on refining policies based on real-world data, ensuring that Medicaid's pain management strategy remains cost-effective, equitable, and sustainable. CMS should require ongoing data collection from state Medicaid programs, focusing on:

- Utilization rates of non-opioid treatments to determine whether expanded access is effectively shifting pain management practices.
- Opioid prescribing trends to measure reductions in opioid dependency.
- Cost-effectiveness analyses comparing Medicaid expenditures on non-opioid treatments versus opioid-related emergency care and addiction services.

- Disparities in treatment access to ensure non-opioid therapies are reaching underserved populations.

CMS should adjust program guidelines as needed based on state performance data. If certain interventions prove particularly effective, CMS should consequently introduce new incentives to promote their broader adoption. Similarly, if specific barriers—such as workforce shortages or geographic disparities—persist, targeted policy interventions should be deployed to address them.

By embedding long-term monitoring into Medicaid's regulatory framework, this implementation plan ensures that non-opioid pain management remains a priority beyond initial adoption. The result should be a sustainable, patient-centered approach that reduces opioid reliance, improves chronic pain outcomes, and enhances the overall efficiency of Medicaid-funded pain management.

Table 4. Summary of Program Implementation Steps

Phase	Timeframe	Key Actions	Primary Stakeholders	Expected Outcomes
Phase 1: Development and Approval	Months 1-24	1. Develop policy framework. 2. Secure CMS regulatory approval 3. Design financial incentives (FMAP increases) 4. Engage congressional committees	CMS, Medicaid directors, public health experts, Congress.	1. Formalized Medicaid guidelines. 2. Initial funding allocations. 3. Defined outcome metrics.
Phase 2: Coalition of the Willing and Pilot Implementation	Months 24-48	1. Recruit early adopter states (VT, OR, KY, WV, OH) 2. Provide FMAP incentives & federal grants 3. Expand Medicaid coverage for non-opioid pain treatments 4. Establish interdisciplinary pain management networks.	CMS, coalition state governments, healthcare providers.	1. Coalition state implementation. 2. Data collection on opioid prescription trends and cost savings. 3. Refinement of policy for national rollout.
Phase 3: State Integration and Provider Incentives	Months 48-72	1. Expand adoption using FMAP incentives. 2. Offer competitive grants for provider network development. 3. Remove prior authorization for non-opioid therapies. 4. Provide CME training grants for providers.	CMS, state Medicaid agencies, healthcare providers.	1. Wider state participation. 2. Increased provider engagement. 3. Expanded patient access to non-opioid treatments.
Phase 4: National Expansion and Federal Oversight	Months 72+	1. Strengthen oversight through state performance evaluations. 2. Develop a Medicaid Pain Management Dashboard. 3. Advocate for sustained funding via congressional support.	CMS, Congress, GAO, Medicaid agencies.	1. Nationwide adoption growth. 2. Public transparency on state performance. 3. Increased federal support for non-opioid treatment integration.
Phase 5: Long-Term Monitoring and Policy Refinement	Ongoing Throughout	1. Track utilization, prescribing trends, cost-effectiveness, and disparities. 2. Adjust FMAP incentives based on effectiveness. 3. Address workforce shortages and geographic barriers.	CMS, state agencies, researchers.	1. Continuous improvement of Medicaid pain management. 2. Reduced opioid reliance. 3. Enhanced health equity.

Finding Relief, Finally

Two years later, Carla's home state of Kentucky state joins a federal Medicaid pilot aimed at improving access to non-opioid pain management. With enhanced funding from CMS and a higher Federal Medical Assistance Percentage, Kentucky now covers physical therapy, CBT, acupuncture, and non-opioid medications under Medicaid, without prior authorization. Carla receives a letter from her Medicaid plan: *You may now be eligible for expanded chronic pain services.*

This time, when Carla visits her primary care clinic—now part of a local interdisciplinary pain management network—she gains access to a team that includes a physical therapist and a behavioral health specialist. They explain that her pain isn't "just in her head;" it's real, and it's manageable. She begins a multimodal treatment plan: weekly PT sessions, virtual CBT coaching from home via a tablet provided through a rural health grant, and a trial of duloxetine to address neuropathic symptoms. For the first time, Carla feels genuinely heard. Her care team takes time to understand her experience, explain her options, and involve her in decisions. She no longer feels like she's facing her pain alone.

Within three months, Carla has reduced her opioid use by half. By six months, she's stopped completely. She still experiences pain, but it's no longer overwhelming. She's sleeping better, missing fewer shifts, and even volunteering at her kids' school again. Most importantly, she feels in control of her health for the first time in years.

What made the difference? Accessible, covered, evidence-based care delivered through a system that values pain relief beyond prescriptions. For Carla, Medicaid finally became not only a safety net, but a path forward.

Conclusion

The opioid crisis remains one of the most pressing public health emergencies in the United States, with Medicaid beneficiaries disproportionately affected due to systemic barriers that limit access to safer, non-opioid pain management options. Despite growing recognition of the risks associated with opioid dependence, Medicaid policies continue to reinforce their use as the default treatment for chronic pain. Inaction will only perpetuate cycles of dependency, exacerbating the crisis of opioid use disorder (OUD), increasing overdose deaths, and burdening both the healthcare system and the broader economy with preventable costs.

This policy framework presents a comprehensive, evidence-based approach to reforming Medicaid's chronic pain management strategy. By implementing federal guidelines that mandate coverage for a core set of non-opioid therapies—such as physical therapy, cognitive-behavioral therapy (CBT), acupuncture, and other multimodal pain management strategies—Medicaid can take a decisive step toward reducing opioid reliance. These reforms would not only standardize access to effective non-opioid treatments across states but also ensure that low-income and rural populations, who often experience the greatest barriers to care, have equitable opportunities for pain relief without the often-concurrent risks of opioid dependency.

State-level disparities have long hindered the adoption of non-opioid treatments, leaving Medicaid beneficiaries in some regions without access to essential pain management services. To address these gaps, this framework proposes a coalition of willing states to lead the way in Medicaid reform, serving as laboratories for innovation while generating critical data on best practices, cost-effectiveness, and patient outcomes. These early adopters—selected based on both their extant Medicaid pain management programs and their exhibited need for OUD-related

intervention—will provide a model for nationwide implementation while mitigating political and financial risks at the federal level.

Beyond coverage expansion, provider participation is a fundamental pillar of these reforms. Many Medicaid providers avoid offering non-opioid treatments due to financial disincentives, bureaucratic hurdles, and a lack of institutional support. This framework proposes increasing Medicaid reimbursement rates for non-opioid therapies, eliminating burdensome prior authorization requirements, and establishing financial incentives for providers who integrate multimodal pain management into their practices. By equipping providers with the resources, education, and incentives necessary to adopt these treatments, the proposed policy framework ensures that non-opioid therapies are not just available in theory but actively utilized in practice.

Failure to act will have severe consequences. Medicaid will continue to allocate billions of dollars to managing opioid addiction and its complications rather than addressing the root causes of dependency; if past trends persist, this monetary amount will only increase as time continues. Beneficiaries will remain trapped in a system where opioids are the most accessible treatment option, increasing their risk of addiction, overdose, and long-term disability. The strain on emergency departments, substance use treatment programs, and Medicaid budgets will only grow, as preventable opioid-related hospitalizations and deaths continue to rise. In contrast, implementing these policy changes will not only reduce opioid prescriptions but also improve health outcomes, enhance patient quality of life, and generate long-term cost savings for state and federal Medicaid programs.

The impact of these reforms extends beyond cost-effectiveness and public health benefits. They represent a fundamental shift in how Medicaid approaches pain management, prioritizing patient-centered care over short-term symptom suppression. For Medicaid beneficiaries, these changes will mean real improvements in their daily lives: less dependence on opioid medications, better functional mobility through physical therapy, reduced psychological distress through behavioral interventions, and a greater ability to manage pain without the fear of addiction. For healthcare providers, these reforms will reduce the ethical and professional conflicts associated with prescribing opioids as the default treatment, allowing them to offer evidence-based alternatives that align with best practices in pain management. For policymakers, these changes present an opportunity to take meaningful action in combating the opioid crisis, reinforcing Medicaid’s role as a safety net program that prioritizes both effectiveness and equity.

The transition away from an opioid-centric Medicaid pain management model is not just a policy recommendation; it is a necessity. The current system is unsustainable, both in human and economic terms, and policymakers must recognize the urgency of this issue and act accordingly by implementing these proposed reforms. By taking the steps outlined in this framework, CMS and Medicaid can lead the nation toward a healthcare system that treats chronic pain in a way that is safe, effective, and equitable. These changes will save lives, reduce suffering, and redefine how chronic pain is managed in the most vulnerable populations. The time to act is now.

Acknowledgments

This project was made possible by the profound insights of my primary advisor, Dr. Albert Mulley, MD, MPP, and course co-directors Margaret Mulley, MS and Dr. Lynn Foster-Johnson, PhD. Peer reviewers and group members Pooja Patel, Katy Axel, Ellie Pitcher, Adam Lee, and Suroor Fatima were also critical to the development of this paper. The support of Dr. Karen Fortuna, PhD, LICSW in the growth of my research skills has been instrumental in this paper's creation. I am also deeply grateful for the endless encouragement of friends and family, who believed I could produce a high-quality and influential piece.

References

1. Dahlhamer J. Prevalence of Chronic Pain and High-Impact Chronic Pain Among Adults — United States, 2016. *MMWR Morb Mortal Wkly Rep*. 2018;67. doi:10.15585/mmwr.mm6736a2
2. Meinhofer A, Witman AE. The role of health insurance on treatment for opioid use disorders: Evidence from the Affordable Care Act Medicaid expansion. *Journal of Health Economics*. 2018;60:177-197. doi:10.1016/j.jhealeco.2018.06.004
3. Janakiram C, Fontelo P, Huser V, et al. Opioid Prescriptions for Acute and Chronic Pain Management Among Medicaid Beneficiaries. *American Journal of Preventive Medicine*. 2019;57(3):365-373. doi:10.1016/j.amepre.2019.04.022
4. Zhang H, Tallavajhala S, Kapadia SN, et al. State Opioid Limits and Volume of Opioid Prescriptions Received by Medicaid Patients. *Medical Care*. 2020;58(12):1111. doi:10.1097/MLR.0000000000001411
5. Vadivelu N, Kai AM, Kodumudi V, Sramcik J, Kaye AD. The Opioid Crisis: a Comprehensive Overview. *Curr Pain Headache Rep*. 2018;22(3):16. doi:10.1007/s11916-018-0670-z
6. U.S. Overdose Deaths Decrease in 2023, First Time Since 2018. May 14, 2024. Accessed October 17, 2024. https://www.cdc.gov/nchs/pressroom/nchs_press_releases/2024/20240515.htm
7. Volkow N, Benveniste H, McLellan AT. Use and Misuse of Opioids in Chronic Pain. *Annual Review of Medicine*. 2018;69(Volume 69, 2018):451-465. doi:10.1146/annurev-med-011817-044739
8. Kaye AD, Jones MR, Kaye AM, et al. Prescription Opioid Abuse in Chronic Pain: An Updated Review of Opioid Abuse Predictors and Strategies to Curb Opioid Abuse: Part 1. *Pain Physician*. 2017;20(2S):S93-S109.
9. Published: Status of State Medicaid Expansion Decisions: Interactive Map. KFF. May 8, 2024. Accessed October 28, 2024. https://www.kff.org/affordable-care-act/issue-brief/status-of-state-medicaid-expansion-decisions-interactive-map/
10. Igolnikov I, Gallagher RM, Hainline B. Chapter 39 - Sport-related injury and pain classification. In: Hainline B, Stern RA, eds. *Handbook of Clinical Neurology*. Vol 158. Sports Neurology. Elsevier; 2018:423-430. doi:10.1016/B978-0-444-63954-7.00039-2
11. Karas AZ, Danneman PJ, Cadillac JM. Chapter 8 - Strategies for Assessing and Minimizing Pain. In: Fish RE, Brown MJ, Danneman PJ, Karas AZ, eds. *Anesthesia and Analgesia in Laboratory Animals (Second Edition)*. American College of Laboratory Animal Medicine. Academic Press; 2008:195-218. doi:10.1016/B978-012373898-1.50012-7
12. Ablin JN. Nociplastic Pain: A Critical Paradigm for Multidisciplinary Recognition and Management. *Journal of Clinical Medicine*. 2024;13(19):5741. doi:10.3390/jcm13195741
13. Bhargava J, Hurley JA. Fibromyalgia. In: *StatPearls*. StatPearls Publishing; 2025. Accessed January 20, 2025. http://www.ncbi.nlm.nih.gov/books/NBK540974/

14. Rudolph KE, Williams NT, Diaz I, et al. Pain Management Treatments and Opioid Use Disorder Risk in Medicaid Patients. *Am J Prev Med*. Published online July 16, 2024:S0749-3797(24)00248-4. doi:10.1016/j.amepre.2024.07.006
15. Chou R, Hartung D, Turner J, et al. Evidence Summary. In: *Opioid Treatments for Chronic Pain [Internet]*. Agency for Healthcare Research and Quality (US); 2020. Accessed October 17, 2024. https://www.ncbi.nlm.nih.gov/books/NBK556247/
16. Sun E, Moshfegh J, Rishel CA, Cook CE, Goode AP, George SZ. Association of Early Physical Therapy With Long-term Opioid Use Among Opioid-Naive Patients With Musculoskeletal Pain. *JAMA Network Open*. 2018;1(8):e185909. doi:10.1001/jamanetworkopen.2018.5909
17. Chou R, Turner JA, Devine EB, et al. The effectiveness and risks of long-term opioid therapy for chronic pain: a systematic review for a National Institutes of Health Pathways to Prevention Workshop. *Ann Intern Med*. 2015;162(4):276-286. doi:10.7326/M14-2559
18. Association of American Medical Colleges. *The Complexities of Physician Supply and Demand: Projections From 2021 to 2036*.; 2024. https://www.aamc.org/media/75236/download
19. Health Resources and Services Administration. *Behavioral Health Workforce, 2023*.; 2023. https://bhw.hrsa.gov/sites/default/files/bureau-health-workforce/Behavioral-Health-Workforce-Brief-2023.pdf
20. Keyes KM, Cerdá M, Brady JE, Havens JR, Galea S. Understanding the Rural–Urban Differences in Nonmedical Prescription Opioid Use and Abuse in the United States. *Am J Public Health*. 2014;104(2):e52-e59. doi:10.2105/AJPH.2013.301709
21. Felter CE, Zalewski K, Jermann R, Palmer PL, Baier AE, Falvey JR. Rural Health: The Dirt Road Less Traveled. *Phys Ther*. 2022;102(11):pzac112. doi:10.1093/ptj/pzac112
22. Baker MB, Liu EC, Bully MA, et al. Overcoming Barriers: A Comprehensive Review of Chronic Pain Management and Accessibility Challenges in Rural America. *Healthcare (Basel)*. 2024;12(17):1765. doi:10.3390/healthcare12171765
23. *OPIOID USE DISORDER: Barriers to Medicaid Beneficiaries' Access to Treatment Medications*. Government Accountability Office; 2020.
24. Drake P, Tolbert J, Rudowitz R, Published AD. How Many Uninsured Are in the Coverage Gap and How Many Could be Eligible if All States Adopted the Medicaid Expansion? KFF. February 26, 2024. Accessed October 28, 2024. https://www.kff.org/medicaid/issue-brief/how-many-uninsured-are-in-the-coverage-gap-and-how-many-could-be-eligible-if-all-states-adopted-the-medicaid-expansion/
25. Højsted J, Sjøgren P. Addiction to opioids in chronic pain patients: A literature review. *European Journal of Pain*. 2007;11(5):490-518. doi:10.1016/j.ejpain.2006.08.004
26. Leslie DL, Ba DM, Agbese E, Xing X, Liu G. The economic burden of the opioid epidemic on states: the case of Medicaid. *Am J Manag Care*. 2019;25(13 Suppl):S243-S249.
27. Garg RK, Fulton-Kehoe D, Franklin GM. Patterns of Opioid Use and Risk of Opioid Overdose Death Among Medicaid Patients. *Medical Care*. 2017;55(7):661. doi:10.1097/MLR.0000000000000738
28. Dowell D, Haegerich TM, Chou R. CDC Guideline for Prescribing Opioids for Chronic Pain--United States, 2016. *JAMA*. 2016;315(15):1624-1645. doi:10.1001/jama.2016.1464
29. Krebs EE, Gravely A, Nugent S, et al. Effect of Opioid vs Nonopioid Medications on Pain-Related Function in Patients With Chronic Back Pain or Hip or Knee Osteoarthritis Pain: The SPACE Randomized Clinical Trial. *JAMA*. 2018;319(9):872-882. doi:10.1001/jama.2018.0899
30. Arredondo K, Touchett HN, Khan S, Vincenti M, Watts BV. Current Programs and Incentives to Overcome Rural Physician Shortages in the United States: A Narrative Review. *Journal of General Internal Medicine*. 2023;38(Suppl 3):916. doi:10.1007/s11606-023-08122-6

31. Spivack SB, Murray GF, Rodriguez HP, Lewis VA. Avoiding Medicaid: Characteristics Of Primary Care Practices With No Medicaid Revenue. *Health affairs (Project Hope)*. 2021;40(1):98. doi:10.1377/hlthaff.2020.00100
32. Grogan CM, Andrews C, Abraham A, et al. Survey Highlights Differences In Medicaid Coverage For Substance Use Treatment And Opioid Use Disorder Medications. *Health Affairs*. 2016;35(12):2289-2296. doi:10.1377/hlthaff.2016.0623
33. McKay M, Gorvine MM, Zaller N, Singh V, Goree J. Federal and Statewide Coverage for Opioid-Sparing Chronic Pain Treatments. *Pain Physician*. 2022;25(9):E1457-E1466.
34. Dowell D. CDC Clinical Practice Guideline for Prescribing Opioids for Pain — United States, 2022. *MMWR Recomm Rep*. 2022;71. doi:10.15585/mmwr.rr7103a1
35. National Academies of Sciences E, Division H and M, Policy B on HS, Disorder C on MAT for OU, Mancher M, Leshner AI. Barriers to Broader Use of Medications to Treat Opioid Use Disorder. In: *Medications for Opioid Use Disorder Save Lives*. National Academies Press (US); 2019. Accessed February 3, 2025. https://www.ncbi.nlm.nih.gov/books/NBK541389/
36. Aguilar FJ. *Scanning the Business Environment*. Macmillan; 1967.
37. Peterson A, Charles V, Yeung D, Coyle K. The Health Equity Framework: A Science- and Justice-Based Model for Public Health Researchers and Practitioners. *Health Promotion Practice*. 2020;22(6):741. doi:10.1177/1524839920950730
38. Wagner EH. Chronic disease management: what will it take to improve care for chronic illness? *Effective Clinical Practice*. 1998;1(1):2-4.
39. Center for Medicare and Medicaid Services. CMS Framework for Health Equity 2022–2032. https://www.cms.gov/files/document/cms-framework-health-equity-2022.pdf
40. Brown-Taylor L, Beckner A, Scaff KE, et al. Relationships between physical therapy intervention and opioid use: A scoping review. *PM R*. 2022;14(7):837-854. doi:10.1002/pmrj.12654
41. Urits I, Patel M, Putz ME, et al. Acupuncture and Its Role in the Treatment of Migraine Headaches. *Neurol Ther*. 2020;9(2):375-394. doi:10.1007/s40120-020-00216-1
42. Jun S, Lee JH, Gong HM, et al. Efficacy and safety of combined treatment of miniscalpel acupuncture and non-steroidal anti-inflammatory drugs: an assessor-blinded randomized controlled pilot study. *Trials*. 2018;19(1):36. doi:10.1186/s13063-017-2418-1
43. Lim JA, Choi SH, Lee WJ, et al. Cognitive-behavioral therapy for patients with chronic pain. *Medicine (Baltimore)*. 2018;97(23):e10867. doi:10.1097/MD.0000000000010867
44. Dey S, Sanders AE, Martinez S, Kopitnik NL, Vrooman BM. Alternatives to Opioids for Managing Pain. In: *StatPearls*. StatPearls Publishing; 2025. Accessed January 21, 2025. http://www.ncbi.nlm.nih.gov/books/NBK574543/
45. Lindner SR, Hart K, Manibusan B, McCarty D, McConnell KJ. State- and County-Level Geographic Variation in Opioid Use Disorder, Medication Treatment, and Opioid-Related Overdose Among Medicaid Enrollees. *JAMA Health Forum*. 2023;4(6):e231574. doi:10.1001/jamahealthforum.2023.1574
46. Gray E, Erickson M, Bindler R, Eti DU, Wilson M. Experiencing COMFORT: Perceptions of Virtually-Delivered Nonpharmacologic Therapies in Adults Prescribed Opioids for Chronic Pain. *Pain Manag Nurs*. 2023;24(4):469-476. doi:10.1016/j.pmn.2023.04.002
47. Miron O, Barda N, Balicer R, Kor A, Lev-Ran S. Association of opioid use disorder with healthcare utilization and cost in a public health system. *Addiction*. 2022;117(11):2880-2886. doi:10.1111/add.15963
48. The Moran Company. Initial Treatment Intervention and Average Total Medicare A/B Costs for FFS Beneficiaries with an Incident Low Back Pain (Lumbago) Diagnosis in CY 2014. https://www.aptqi.com/Resources/documents/APTQI-Complete-Study-Initial-Treatment-Intervention-Lumbago-May-2017.pdf

49. Centers for Medicare & Medicaid Services. *Physical and Mental Health Condition Prevalence and Comorbidity among Fee-for-Service Medicare-Medicaid Enrollees*. Centers for Medicare & Medicaid Services; 2014.
50. Allen EM, Call KT, Beebe TJ, McAlpine DD, Johnson PJ. Barriers to Care and Healthcare Utilization among the Publicly Insured. *Med Care*. 2017;55(3):207-214. doi:10.1097/MLR.0000000000000644
51. Foutz J, Artiga S, Published RG. The Role of Medicaid in Rural America. KFF. April 25, 2017. Accessed January 21, 2025. https://www.kff.org/medicaid/issue-brief/the-role-of-medicaid-in-rural-america/
52. Ahmed A, McHenry N, Gulati S, Shah I, Sheth SG. Racial and Ethnic Disparities in Opioid Prescriptions for Patients with Abdominal Pain: Analysis of the National Ambulatory Medical Care Survey. *J Clin Med*. 2023;12(15):5030. doi:10.3390/jcm12155030
53. National Academies of Sciences E, Division H and M, Health B on G, et al. Effectiveness, Safety, and Cost-Effectiveness of Nonpharmacological and Nonsurgical Therapies for Chronic Pain. In: *The Role of Nonpharmacological Approaches to Pain Management: Proceedings of a Workshop*. National Academies Press (US); 2019. Accessed January 21, 2025. https://www.ncbi.nlm.nih.gov/books/NBK541698/
54. Bowser D, Bohler R, Davis MT, Hodgkin D, Horgan C. Payment-related barriers to medications for opioid use disorder: A critical review of the literature and real-world application. *J Subst Use Addict Treat*. 2024;165:209441. doi:10.1016/j.josat.2024.209441
55. Bhattad PB, Pacifico L. Empowering Patients: Promoting Patient Education and Health Literacy. *Cureus*. 14(7):e27336. doi:10.7759/cureus.27336
56. Williamson K, Alikhan S, Greene K, Becker M, Tewarson H. Expanding Access To Non-Opioid Management Of Chronic Pain. National Governors Association. August 31, 2020. Accessed January 21, 2025. https://www.nga.org/publications/expanding-access-non-opioid-management-chronic-pain/
57. Louw A, Puentedura EJ, Zimney K, Schmidt S. Know Pain, Know Gain? A Perspective on Pain Neuroscience Education in Physical Therapy. *Journal of Orthopaedic & Sports Physical Therapy*. 2016;46(3):131-134. doi:10.2519/jospt.2016.0602
58. Bandy WD, Sanders B. *Therapeutic Exercise for Physical Therapist Assistants*. Lippincott Williams & Wilkins; 2007.
59. Farrell JP, Jensen GM. Manual Therapy: A Critical Assessment of Role in the Profession of Physical Therapy. *Physical Therapy*. 1992;72(12):843-852. doi:10.1093/ptj/72.12.843
60. Kabat H, Knott M. Principles of Neuromuscular Reeducation. *Physical Therapy*. 1948;28(3):107-111. doi:10.1093/ptj/28.3.107
61. National Academies of Sciences E, Division H and M, Services B on HC, Treatment C on IDMCL to I with. Musculoskeletal Disorders. In: *Selected Health Conditions and Likelihood of Improvement with Treatment*. National Academies Press (US); 2020. Accessed February 2, 2025. https://www.ncbi.nlm.nih.gov/books/NBK559512/
62. Kantak SS, Johnson T, Zarzycki R. Linking Pain and Motor Control: Conceptualization of Movement Deficits in Patients With Painful Conditions. *Physical Therapy*. 2022;102(4):pzab289. doi:10.1093/ptj/pzab289
63. Young JJ, Pedersen JR, Bricca A. Exercise Therapy for Knee and Hip Osteoarthritis: Is There An Ideal Prescription? *Curr Treatm Opt Rheumatol*. Published online May 20, 2023:1-17. doi:10.1007/s40674-023-00205-z
64. Casanova-Rodríguez D, Ranchal-Sánchez A, Rodríguez RB, Jurado-Castro JM. Aerobic Exercise Prescription for Pain Reduction in Fibromyalgia: A Systematic Review and Meta-Analysis. *Eur J Pain*. 2025;29(2):e4783. doi:10.1002/ejp.4783
65. Vibe Fersum K, O'Sullivan P, Skouen JS, Smith A, Kvåle A. Efficacy of classification-based cognitive functional therapy in patients with non-specific chronic low back pain: a

randomized controlled trial. *Eur J Pain*. 2013;17(6):916-928. doi:10.1002/j.1532-2149.2012.00252.x
66. Aoyagi K, Neogi T, Peloquin C, et al. Association of Physical Therapy Interventions With Long-term Opioid Use After Total Knee Replacement. *JAMA Netw Open*. 2021;4(10):e2131271. doi:10.1001/jamanetworkopen.2021.31271
67. Theysohn N, Choi KE, Gizewski ER, et al. Acupuncture-Related Modulation of Pain-Associated Brain Networks During Electrical Pain Stimulation: A Functional Magnetic Resonance Imaging Study. *J Altern Complement Med*. 2014;20(12):893-900. doi:10.1089/acm.2014.0105
68. GAO P, GAO X, FU T, XU D, WEN Q. Acupuncture: Emerging evidence for its use as an analgesic (Review). *Exp Ther Med*. 2015;9(5):1577-1581. doi:10.3892/etm.2015.2348
69. Chen B, Liu D, Li T, et al. Research Hotspots and Trends on Acupuncture for Anti-Inflammation: A Bibliometric Analysis from 2011 to 2021. *J Pain Res*. 2023;16:1197-1217. doi:10.2147/JPR.S398393
70. Vickers AJ, Cronin AM, Maschino AC, et al. Acupuncture for chronic pain: individual patient data meta-analysis. *Arch Intern Med*. 2012;172(19):1444-1453. doi:10.1001/archinternmed.2012.3654
71. Zheng Z, Gibson S, Helme RD, et al. Effects of Electroacupuncture on Opioid Consumption in Patients with Chronic Musculoskeletal Pain: A Multicenter Randomized Controlled Trial. *Pain Medicine*. 2019;20(2):397-410. doi:10.1093/pm/pny113
72. Nielsen A, Dusek JA, Taylor-Swanson L, Tick H. Acupuncture Therapy as an Evidence-Based Nonpharmacologic Strategy for Comprehensive Acute Pain Care: The Academic Consortium Pain Task Force White Paper Update. *Pain Med*. 2022;23(9):1582-1612. doi:10.1093/pm/pnac056
73. Davis RT, Badger G, Valentine K, Cavert A, Coeytaux RR. Acupuncture for Chronic Pain in the Vermont Medicaid Population: A Prospective, Pragmatic Intervention Trial. *Glob Adv Health Med*. 2018;7:2164956118769557. doi:10.1177/2164956118769557
74. Nahin RL, Boineau R, Khalsa PS, Stussman BJ, Weber WJ. Evidence-Based Evaluation of Complementary Health Approaches for Pain Management in the United States. *Mayo Clin Proc*. 2016;91(9):1292-1306. doi:10.1016/j.mayocp.2016.06.007
75. Bonakdar R, Palanker D, Sweeney MM. Analysis of State Insurance Coverage for Nonpharmacologic Treatment of Low Back Pain as Recommended by the American College of Physicians Guidelines. *Glob Adv Health Med*. 2019;8:2164956119855629. doi:10.1177/2164956119855629
76. Derry S, Bell RF, Straube S, Wiffen PJ, Aldington D, Moore RA. Pregabalin for neuropathic pain in adults. *Cochrane Database Syst Rev*. 2019;2019(1):CD007076. doi:10.1002/14651858.CD007076.pub3
77. Commissioner O of the. FDA Approves Novel Non-Opioid Treatment for Moderate to Severe Acute Pain. FDA. January 30, 2025. Accessed February 2, 2025. https://www.fda.gov/news-events/press-announcements/fda-approves-novel-non-opioid-treatment-moderate-severe-acute-pain
78. Hosseinzadeh F, Nourazarian A. Biochemical strategies for opioid-sparing pain management in the operating room. *Biochemistry and Biophysics Reports*. 2025;41:101927. doi:10.1016/j.bbrep.2025.101927
79. McCracken LM, Vowles KE. Acceptance and commitment therapy and mindfulness for chronic pain: model, process, and progress. *Am Psychol*. 2014;69(2):178-187. doi:10.1037/a0035623
80. Zeidan F, Martucci KT, Kraft RA, Gordon NS, McHaffie JG, Coghill RC. Brain Mechanisms Supporting the Modulation of Pain by Mindfulness Meditation. *J Neurosci*. 2011;31(14):5540-5548. doi:10.1523/JNEUROSCI.5791-10.2011

81. Zhang Q, Xu H, Wang Y, Jiang J, Xue Q, Qiu Z. Efficacy of cognitive behavioral therapy for reducing pain susceptibility and increasing social engagement in patients with chronic low back pain: A systematic review and meta-analysis. *Medicine (Baltimore)*. 2023;102(45):e35269. doi:10.1097/MD.0000000000035269
82. Cherkin DC, Sherman KJ, Balderson BH, et al. Effect of Mindfulness-Based Stress Reduction vs Cognitive Behavioral Therapy or Usual Care on Back Pain and Functional Limitations in Adults With Chronic Low Back Pain: A Randomized Clinical Trial. *JAMA*. 2016;315(12):1240-1249. doi:10.1001/jama.2016.2323
83. Garland EL, Manusov EG, Froeliger B, Kelly A, Williams JM, Howard MO. Mindfulness-Oriented Recovery Enhancement for Chronic Pain and Prescription Opioid Misuse: Results from an Early Stage Randomized Controlled Trial. *J Consult Clin Psychol*. 2014;82(3):448-459. doi:10.1037/a0035798
84. Johnson MI, Claydon LS, Herbison GP, Jones G, Paley CA. Transcutaneous electrical nerve stimulation (TENS) for fibromyalgia in adults. *Cochrane Database Syst Rev*. 2017;2017(10):CD012172. doi:10.1002/14651858.CD012172.pub2
85. Malik K, Dua A. Biofeedback. In: *StatPearls [Internet]*. StatPearls Publishing; 2023. Accessed February 2, 2025. https://www.ncbi.nlm.nih.gov/sites/books/NBK553075/
86. Kaiser Family Foundation. Medicaid Benefits: Physical Therapy Services. Accessed February 3, 2025. https://www.kff.org/medicaid/state-indicator/physical-therapy-services/
87. Centers for Medicare & Medicaid Services. OUTPATIENT THERAPY CAPS: EXCEPTIONS PROCESS REQUIRED BY THE DRA. Accessed February 3, 2025. https://www.cms.gov/newsroom/fact-sheets/outpatient-therapy-caps-exceptions-process-required-dra
88. Freburger JK, Carey TS, Holmes GM. Physical Therapy for Chronic Low Back Pain in North Carolina: Overuse, Underuse, or Misuse? *Phys Ther*. 2011;91(4):484-495. doi:10.2522/ptj.20100281
89. Edlund MJ, Martin BC, Russo JE, DeVries A, Braden JB, Sullivan MD. The role of opioid prescription in incident opioid abuse and dependence among individuals with chronic noncancer pain: the role of opioid prescription. *Clin J Pain*. 2014;30(7):557-564. doi:10.1097/AJP.0000000000000021
90. Centers for Medicare & Medicaid Services. CMS Roadmap: Strategy to Fight the Opioid Crisis. Published online June 2020. https://www.cms.gov/about-cms/agency-information/emergency/downloads/opioid-epidemic-roadmap.pdf
91. Traylor C. *CMCS Informational Bulletin: Medicaid Strategies for Non-Opioid Pharmacologic and NonPharmacologic Chronic Pain Management*. Centers for Medicare & Medicaid Services; 2019.
92. Kaseweter K, Nazemi M, Gregoire N, Louw WF, Walsh Z, Holtzman S. Physician perspectives on chronic pain management: barriers and the use of eHealth in the COVID-19 era. *BMC Health Serv Res*. 2023;23:1131. doi:10.1186/s12913-023-10157-8
93. Martino SC, Mathews M, Agniel D, et al. National racial/ethnic and geographic disparities in experiences with health care among adult Medicaid beneficiaries. *Health Serv Res*. 2019;54(Suppl 1):287-296. doi:10.1111/1475-6773.13106
94. Deslauriers S, Roy JS, Bernatsky S, et al. The burden of waiting to access pain clinic services: perceptions and experiences of patients with rheumatic conditions. *BMC Health Serv Res*. 2021;21:160. doi:10.1186/s12913-021-06114-y
95. National Center for Complementary and Integrative Health. Analysis Finds Differences in Chronic Pain Treatment by Type of Health Insurance. Accessed February 3, 2025. https://www.nccih.nih.gov/research/research-results/analysis-finds-differences-in-chronic-pain-treatment-by-type-of-health-insurance

96. Glynn LH, Chen JA, Dawson TC, Gelman H, Zeliadt SB. Bringing Chronic-Pain Care to Rural Veterans: A Telehealth Pilot Program Description. *Psychol Serv*. 2021;18(3):310-318. doi:10.1037/ser0000408
97. Day MA, Ciol MA, Mendoza ME, et al. The effects of telehealth-delivered mindfulness meditation, cognitive therapy, and behavioral activation for chronic low back pain: a randomized clinical trial. *BMC Med*. 2024;22:156. doi:10.1186/s12916-024-03383-2
98. Buabbas AJ, Albahrouh SE, Alrowayeh HN, Alshawaf H. Telerehabilitation during the COVID-19 Pandemic: Patients and Physical Therapists' Experiences. *Med Princ Pract*. 2022;31(2):156-164. doi:10.1159/000523775
99. Anawade PA, Sharma D, Gahane S. A Comprehensive Review on Exploring the Impact of Telemedicine on Healthcare Accessibility. *Cureus*. 16(3):e55996. doi:10.7759/cureus.55996
100. Hilty DM, Gentry MT, McKean AJ, Cowan KE, Lim RF, Lu FG. Telehealth for rural diverse populations: telebehavioral and cultural competencies, clinical outcomes and administrative approaches. *Mhealth*. 2020;6:20. doi:10.21037/mhealth.2019.10.04
101. Center for Medicare and Medicaid Services. *Disparities in Health Care in Medicare Advantage Associated with Dual Eligibility or Eligibility for a Low-Income Subsidy and Disability*. Center for Medicare and Medicaid Services; 2024. https://www.cms.gov/files/document/2024-disparities-health-care-medicare-advantage-associated-dual-eligibility-or-eligibility-low.pdf
102. Rikard SM. Chronic Pain Among Adults — United States, 2019–2021. *MMWR Morb Mortal Wkly Rep*. 2023;72. doi:10.15585/mmwr.mm7215a1
103. Skaggs P, Bell SB, Scutchfield FD, Robinson LE. Providers' Stigmas and the Effects on Patients with Opioid Use Disorder: A Scoping Review. *J Appalach Health*. 2023;4(3):87-102. doi:10.13023/jah.0403.06
104. Pielech M, Lunde CE, Becker SJ, Vowles KE, Sieberg CB. Co-morbid chronic pain and opioid misuse in youth: Knowns, unknowns, and implications for behavioral treatment. *Am Psychol*. 2020;75(6):811-824. doi:10.1037/amp0000655
105. Clark MR, Cox TS. Refractory chronic pain. *Psychiatr Clin North Am*. 2002;25(1):71-88. doi:10.1016/s0193-953x(03)00053-4
106. Ashcraft LE, Hamm ME, Omowale SS, et al. The perpetual evidence-practice gap: addressing ongoing barriers to chronic pain management in primary care in three steps. *Front Pain Res (Lausanne)*. 2024;5:1376462. doi:10.3389/fpain.2024.1376462
107. Nuckols TK, Anderson L, Popescu I, et al. Opioid prescribing: a systematic review and critical appraisal of guidelines for chronic pain. *Ann Intern Med*. 2014;160(1):38-47. doi:10.7326/0003-4819-160-1-201401070-00732
108. Walden G. *SUPPORT for Patients and Communities Act*.; 2018. Accessed February 3, 2025. https://www.congress.gov/bill/115th-congress/house-bill/6
109. Baker RG, Koroshetz WJ, Volkow ND. The Helping to End Addiction Long-term (HEAL) Initiative of the National Institutes of Health. *JAMA*. 2021;326(11):1005-1006. doi:10.1001/jama.2021.13300
110. Medicaid and CHIP Payment and Access Commission. *Medicaid and Rural Health*.; 2021. https://www.macpac.gov/wp-content/uploads/2021/04/Medicaid-and-Rural-Health.pdf
111. Center for Connected Health Policy. *State Telehealth Laws and Medicaid Program Policies - Fall 2023*.; 2023. https://www.cchpca.org/2023/10/Fall2023_ExecutiveSummaryfinal.pdf
112. Kaiser Family Foundation. Medicaid Behavioral Health Services: Individual Therapy. KFF. Accessed February 3, 2025. https://www.kff.org/medicaid/state-indicator/medicaid-behavioral-health-services-individual-therapy/
113. Boloori A, Arnetz BB, Viens F, Maiti T, Arnetz JE. Misalignment of Stakeholder Incentives in the Opioid Crisis. *Int J Environ Res Public Health*. 2020;17(20):7535. doi:10.3390/ijerph17207535

114. Miller EL. High Medication Costs to Treat Patients with Chronic Pain. *Pain Management Nursing*. 2023;24(6):573-574. doi:10.1016/j.pmn.2023.10.006
115. Capito SM. *Non-Opioids Prevent Addiction In the Nation Act (NOPAIN) Act*.; 2021.
116. National Institutes of Health. Open Funding Opportunities | NIH HEAL Initiative. September 6, 2019. Accessed February 3, 2025. https://heal.nih.gov/funding/open
117. Blanco C, Ali MM, Beswick A, et al. The American Opioid Epidemic in Special Populations: Five Examples. *NAM Perspectives*. Published online October 26, 2020. doi:10.31478/202010b
118. Edmiston K, AlZuBi J. *Trends in Telehealth and Its Implications for Health Disparities*. National Association of Insurance Commissioners, Center for Insurance Policy & Research; 2022. https://content.naic.org/sites/default/files/Telehealth%20and%20Health%20Disparities.pdf
119. Bennett K. Policymakers Continue Focus on Non-Opioids for Pain Management. *Practical Pain Management*. 2023;23(3). Accessed February 3, 2025. https://www.medcentral.com/meds/opioids/policymakers-continue-focus-on-non-opioids-for-pain-management
120. US Department of Transportation. Rural Opportunities to Use Transportation for Economic Success (ROUTES). Accessed February 3, 2025. https://www.transportation.gov/rural
121. Musumeci M, Rudowitz R. Medicaid Non-Emergency Medical Transportation: Overview and Key Issues in Medicaid Expansion Waivers. KFF. February 24, 2016. Accessed February 3, 2025. https://www.kff.org/medicaid/issue-brief/medicaid-non-emergency-medical-transportation-overview-and-key-issues-in-medicaid-expansion-waivers/
122. Federation of State Medical Boards. *Continuing Medical Education: Board-by-Board Overview*.; 2024. https://www.fsmb.org/siteassets/advocacy/key-issues/continuing-medical-education-by-state.pdf
123. Center for Public Health Law Research Staff. State Laws Limiting Prescriptions for Opioid Analgesics. Prescription Drug Abuse Policy System. December 31, 2019. Accessed February 3, 2025. https://pdaps.org/datasets/opioid-analgesics-prescribing-limits
124. Onstott TN, Hurst S, Kronick R, Tsou AC, Groessl E, McMenamin SB. Health Insurance Mandates for Nonpharmacological Pain Treatments in 7 US States. *JAMA Netw Open*. 2024;7(4):e245737. doi:10.1001/jamanetworkopen.2024.5737
125. Lee B, Zhao W, Yang KC, Ahn YY, Perry BL. Systematic Evaluation of State Policy Interventions Targeting the US Opioid Epidemic, 2007-2018. *JAMA Network Open*. 2021;4(2):e2036687. doi:10.1001/jamanetworkopen.2020.36687
126. Franz J. *Covering Pain: Integrative Treatment Accessible to More Vermonters*. The University of Vermont Larner College of Medicine; 2023. Accessed February 11, 2025. https://www.med.uvm.edu/medicine/news/2023/11/08/covering_pain_integrative_treatment_for_chronic_pain_now_accessible_to_more_vermonters
127. Gray M, LaForge K, Livingston CJ, Leichtling G, Choo EK. Experiences of Nonpharmacologic Providers Implementing the Oregon Back Pain Policy Expanding Services for Medicaid Recipients: A Focus Group Study. *J Altern Complement Med*. 2021;27(10):868-875. doi:10.1089/acm.2021.0099
128. *Drug Overdose Mortality by State*. Centers for Disease Control and Prevention; 2025. Accessed February 11, 2025. https://www.cdc.gov/nchs/pressroom/sosmap/drug_poisoning_mortality/drug_poisoning.htm
129. *Mental Health in West Virginia*. Kaiser Family Foundation Accessed February 11, 2025. https://www.kff.org/statedata/mental-health-and-substance-use-state-fact-sheets/
130. Spencer M, Garnett M, Miniño A. *Drug Overdose Deaths in the United States, 2002–2022*. Centers for Disease Control and Prevention; 2024. https://www.cdc.gov/nchs/products/databriefs/db491.htm

131. Alexander D, Schnell M. The Impacts of Physician Payments on Patient Access, Use, and Health. Published online July 2019. doi:10.3386/w26095
132. Ghoshal M, Shapiro H, Todd K, Schatman ME. Chronic Noncancer Pain Management and Systemic Racism: Time to Move Toward Equal Care Standards. *J Pain Res*. 2020;13:2825-2836. doi:10.2147/JPR.S287314
133. Hoffman KM, Trawalter S, Axt JR, Oliver MN. Racial bias in pain assessment and treatment recommendations, and false beliefs about biological differences between blacks and whites. *Proceedings of the National Academy of Sciences*. 2016;113(16):4296-4301. doi:10.1073/pnas.1516047113
134. Chen JA, DeFaccio RJ, Gelman H, et al. Telehealth and Rural-Urban Differences in Receipt of Pain Care in the Veterans Health Administration. *Pain Med*. 2022;23(3):466-474. doi:10.1093/pm/pnab194
135. Wen H, Hockenberry JM, Jeng PJ, Bao Y. Prescription Drug Monitoring Program Mandates: Impact On Opioid Prescribing And Related Hospital Use. *Health Aff (Millwood)*. 2019;38(9):1550-1556. doi:10.1377/hlthaff.2019.00103
136. CMS Rulemaking | CMS. Accessed February 14, 2025. https://www.cms.gov/medicare/regulations-guidance/cms-rulemaking
137. *Medicaid Program; State Plan Home and Community-Based Services, 5-Year Period for Waivers, Provider Payment Reassignment, and Home and Community-Based Setting Requirements for Community First Choice and Home and Community-Based Services (HCBS) Waivers*. Centers for Medicare & Medicaid Services; 2014. https://www.federalregister.gov/documents/2014/01/16/2014-00487/medicaid-program-state-plan-home-and-community-based-services-5-year-period-for-waivers-provider
138. Lyon SM, Douglas IS, Cooke CR. Medicaid Expansion under the Affordable Care Act. Implications for Insurance-related Disparities in Pulmonary, Critical Care, and Sleep. *Ann Am Thorac Soc*. 2014;11(4):661-667. doi:10.1513/AnnalsATS.201402-072PS
139. Chimenti RL, Frey-Law LA, Sluka KA. A Mechanism-Based Approach to Physical Therapist Management of Pain. *Phys Ther*. 2018;98(5):302-314. doi:10.1093/ptj/pzy030
140. Shahidi B, Padwal J, Lee E, et al. Factors impacting adherence to an exercise-based physical therapy program for individuals with low back pain. *PLoS One*. 2022;17(10):e0276326. doi:10.1371/journal.pone.0276326
141. Collado-Mateo D, Lavín-Pérez AM, Peñacoba C, et al. Key Factors Associated with Adherence to Physical Exercise in Patients with Chronic Diseases and Older Adults: An Umbrella Review. *Int J Environ Res Public Health*. 2021;18(4):2023. doi:10.3390/ijerph18042023
142. In brief: Physical therapy. In: *InformedHealth.Org [Internet]*. Institute for Quality and Efficiency in Health Care (IQWiG); 2024. Accessed February 23, 2025. https://www.ncbi.nlm.nih.gov/books/NBK561514/
143. Qi W, He B, Gu Q, Li Y, Liang F. Scientific exploration and hypotheses concerning the meridian system in traditional Chinese medicine. *Acupuncture and Herbal Medicine*. 2024;4(3):283. doi:10.1097/HM9.0000000000000128
144. MacPherson H, Vertosick EA, Foster NE, et al. The persistence of the effects of acupuncture after a course of treatment: a meta-analysis of patients with chronic pain. *Pain*. 2017;158(5):784-793. doi:10.1097/j.pain.0000000000000747
145. Qaseem A, Wilt TJ, McLean RM, et al. Noninvasive Treatments for Acute, Subacute, and Chronic Low Back Pain: A Clinical Practice Guideline From the American College of Physicians. *Ann Intern Med*. 2017;166(7):514-530. doi:10.7326/M16-2367
146. Anderson BJ, Meissner P, Mah DM, et al. Barriers and Facilitators to Implementing Bundled Acupuncture and Yoga Therapy to Treat Chronic Pain in Community Healthcare Settings: A Feasibility Pilot. *J Altern Complement Med*. 2021;27(6):496-505. doi:10.1089/acm.2020.0394

147. Liu W, Towell-Barnard A, Lee KH, Leen Kang T. Participants experiences regarding the use of acupuncture as a treatment modality: A qualitative systematic review. *Complementary Therapies in Clinical Practice*. 2024;57:101866. doi:10.1016/j.ctcp.2024.101866
148. Ayoub SS. Paracetamol (acetaminophen): A familiar drug with an unexplained mechanism of action. *Temperature (Austin)*. 8(4):351-371. doi:10.1080/23328940.2021.1886392
149. Qureshi O, Dua A. COX Inhibitors. In: *StatPearls*. StatPearls Publishing; 2025. Accessed February 2, 2025. http://www.ncbi.nlm.nih.gov/books/NBK549795/
150. Wiffen PJ, Derry S, Moore RA, et al. Antiepileptic drugs for neuropathic pain and fibromyalgia - an overview of Cochrane reviews. *Cochrane Database Syst Rev*. 2013;2013(11):CD010567. doi:10.1002/14651858.CD010567.pub2
151. Finnerup NB, Attal N, Haroutounian S, et al. Pharmacotherapy for neuropathic pain in adults: a systematic review and meta-analysis. *Lancet Neurol*. 2015;14(2):162-173. doi:10.1016/S1474-4422(14)70251-0
152. Lee S. Pharmacological Inhibition of Voltage-gated Ca2+ Channels for Chronic Pain Relief. *Curr Neuropharmacol*. 2013;11(6):606-620. doi:10.2174/1570159X11311060005
153. Skljarevski V, Zhang S, Iyengar S, et al. Efficacy of Duloxetine in Patients with Chronic Pain Conditions. *Curr Drug ther*. 2011;6(4):296-303. doi:10.2174/157488511798109592
154. Birkinshaw H, Friedrich CM, Cole P, et al. Antidepressants for pain management in adults with chronic pain: a network meta-analysis. *Cochrane Database Syst Rev*. 2023;2023(5):CD014682. doi:10.1002/14651858.CD014682.pub2
155. Machado GC, Maher CG, Ferreira PH, et al. Efficacy and safety of paracetamol for spinal pain and osteoarthritis: systematic review and meta-analysis of randomised placebo controlled trials. *BMJ*. 2015;350:h1225. doi:10.1136/bmj.h1225
156. Hochberg MC, Altman RD, April KT, et al. American College of Rheumatology 2012 recommendations for the use of nonpharmacologic and pharmacologic therapies in osteoarthritis of the hand, hip, and knee. *Arthritis Care Res (Hoboken)*. 2012;64(4):465-474. doi:10.1002/acr.21596
157. Busse JW, Wang L, Kamaleldin M, et al. Opioids for Chronic Noncancer Pain: A Systematic Review and Meta-analysis. *JAMA*. 2018;320(23):2448-2460. doi:10.1001/jama.2018.18472
158. Arumugam S, Lau CS, Chamberlain RS. Use of preoperative gabapentin significantly reduces postoperative opioid consumption: a meta-analysis. *J Pain Res*. 2016;9:631-640. doi:10.2147/JPR.S112626
159. Acetaminophen. In: *LiverTox: Clinical and Research Information on Drug-Induced Liver Injury*. National Institute of Diabetes and Digestive and Kidney Diseases; 2012. Accessed February 2, 2025. http://www.ncbi.nlm.nih.gov/books/NBK548162/
160. Stiller CO, Hjemdahl P. Lessons from 20 years with COX-2 inhibitors: Importance of dose–response considerations and fair play in comparative trials. *Journal of Internal Medicine*. 2022;292(4):557-574. doi:10.1111/joim.13505
161. Kelly K, Posternak M, Jonathan EA. Toward achieving optimal response: understanding and managing antidepressant side effects. *Dialogues Clin Neurosci*. 2008;10(4):409-418.
162. Leuchter AF, Cook IA, Hunter AM, Korb AS. A new paradigm for the prediction of antidepressant treatment response. *Dialogues Clin Neurosci*. 2009;11(4):435-446.
163. Feliu-Soler A, Montesinos F, Gutiérrez-Martínez O, Scott W, McCracken LM, Luciano JV. Current status of acceptance and commitment therapy for chronic pain: a narrative review. *J Pain Res*. 2018;11:2145-2159. doi:10.2147/JPR.S144631
164. Hofmann SG, Gómez AF. Mindfulness-Based Interventions for Anxiety and Depression. *Psychiatr Clin North Am*. 2017;40(4):739-749. doi:10.1016/j.psc.2017.08.008
165. Lentz TA, Gonzalez-Smith J, Huber K, Goertz C, Bleser WK, Saunders R. Overcoming Barriers to the Implementation of Integrated Musculoskeletal Pain Management Programs:

A Multi-Stakeholder Qualitative Study. *The Journal of Pain*. 2023;24(5):860-873. doi:10.1016/j.jpain.2022.12.015
166. Tauben DJ, Langford DJ, Sturgeon JA, et al. Optimizing telehealth pain care after COVID-19. *Pain*. 2020;161(11):2437-2445. doi:10.1097/j.pain.0000000000002048
167. Teoli D, Dua A, An J. Transcutaneous Electrical Nerve Stimulation. In: *StatPearls*. StatPearls Publishing; 2025. Accessed February 23, 2025. http://www.ncbi.nlm.nih.gov/books/NBK537188/
168. Vance CG, Dailey DL, Rakel BA, Sluka KA. Using TENS for pain control: the state of the evidence. *Pain Manag*. 2014;4(3):197-209. doi:10.2217/pmt.14.13
169. Calderone A, Mazzurco Masi VM, De Luca R, et al. The impact of biofeedback in enhancing chronic pain rehabilitation: A systematic review of mechanisms and outcomes. *Heliyon*. 2025;11(2):e41917. doi:10.1016/j.heliyon.2025.e41917
170. Gibson W, Wand BM, Meads C, Catley MJ, O'Connell NE. Transcutaneous electrical nerve stimulation (TENS) for chronic pain - an overview of Cochrane Reviews. *Cochrane Database Syst Rev*. 2019;2019(4):CD011890. doi:10.1002/14651858.CD011890.pub3
171. Johnson MI. Resolving Long-Standing Uncertainty about the Clinical Efficacy of Transcutaneous Electrical Nerve Stimulation (TENS) to Relieve Pain: A Comprehensive Review of Factors Influencing Outcome. *Medicina (Kaunas)*. 2021;57(4):378. doi:10.3390/medicina57040378
172. Rao SS, Valestin J, Brown CK, Zimmerman B, Schulze K. LONG TERM EFFICACY OF BIOFEEDBACK THERAPY FOR DYSSYNERGIA -RANDOMIZED CONTROLLED TRIAL. *Am J Gastroenterol*. 2010;105(4):890-896. doi:10.1038/ajg.2010.53

Appendix

Table 1. Summary of Non-Opioid Chronic Pain Management Intervention Information

Intervention	Description	Mechanism of Action	Effectiveness	Impact on Opioid Use	Limitations
Physical Therapy	Physical therapy uses targeted exercises, manual therapy, and patient education to restore movement, reduce pain, and improve function. Techniques include strengthening, stretching, aerobic conditioning, joint mobilization, soft tissue manipulation, massage, neuromuscular re-education, and pain neuroscience education.[57–60] It is widely used for musculoskeletal disorders, movement dysfunctions, and post-surgical rehabilitation.	Physical therapy alleviates pain through multiple mechanisms. It promotes endogenous pain inhibition via exercise and manual therapy,[139] enhances joint mobility and muscle strength to reduce strain on affected areas,[61] and corrects postural and movement dysfunctions.[62] Pain neuroscience education reduces fear-avoidance behaviors, enhancing self-efficacy.[57] PT also addresses central sensitization by retraining the nervous system to decrease hypersensitivity to pain stimuli.[57]	Clinical trials show that physical therapy significantly reduces disability and pain severity in chronic low back pain, osteoarthritis, and fibromyalgia. In chronic low back pain, PT improves mobility and function while reducing reliance on medications. In osteoarthritis, exercise therapy enhances joint function and decreases pain in knee and hip OA.[63] For fibromyalgia, a combination of aerobic exercise, strength training, and manual therapy reduces pain intensity and fatigue.[64] Early PT initiation is linked to improved outcomes and reduced long-term pain severity, while delays increase healthcare costs.[40]	Physical therapy plays a key role in opioid reduction by addressing the root cause of pain rather than masking symptoms. Patients who receive early PT for musculoskeletal pain are 10% less likely to use opioids long-term.[16] In a randomized controlled trial of chronic low back pain, a combination of exercise therapy and pain neuroscience education resulted in significantly lowered opioid use compared to usual care.[65] Studies on post-surgical rehabilitation demonstrate that pre- and post-operative PT reduces opioid consumption following knee replacement surgery.[66] Importantly, PT is associated with comparable levels of pain relief to opioid	Access to physical therapy is limited by availability of trained professionals and variable insurance coverage. Patient adherence to PT regimens varies, with some individuals discontinuing due to perceived lack of immediate relief.[140] Success depends on regular participation and long-term commitment to exercise programs.[141] Additionally, effectiveness varies depending on individual patient characteristics and conditions.[142]

				medication without adverse side effects.[29]	
Acupuncture	Acupuncture involves inserting fine needles into specific body points to regulate physiological functions and pain perception. Based on traditional Chinese medicine, these points are believed to correspond to energy pathways, or meridians.[143] Modern research suggests that acupuncture influences pain processing in the central nervous system, altering neural activity and inflammatory responses.[67–69] Variations include manual acupuncture, electroacupuncture, and auricular (ear) acupuncture.	Acupuncture modulates central pain pathways, as observed through functional MRI studies, by stimulating neural circuits involved in pain perception.[67] It also promotes the release of endogenous opioids, such as endorphins and enkephalins, which naturally reduce pain and enhance mood.[68] Additionally, acupuncture downregulates pro-inflammatory cytokines, reducing systemic inflammation that can contribute to chronic pain.[69] By altering neurotransmitter activity and reducing stress hormone levels, acupuncture affects both physical and emotional pain responses.	Large-scale systematic reviews and meta-analyses confirm acupuncture's effectiveness in treating chronic back and neck pain, osteoarthritis, migraines, and musculoskeletal pain. A JAMA Internal Medicine meta-analysis of 29 RCTs with nearly 18,000 patients concluded that acupuncture provided statistically significant pain relief beyond placebo and standard medical care.[70] Another meta-analysis found that acupuncture was superior to sham acupuncture and usual care, demonstrating its physiological rather than placebo-based efficacy.[144] Clinical guidelines from the American College of Physicians now recommend acupuncture as a first-line non-pharmacologic therapy for chronic low back pain.[145]	Acupuncture reduces opioid prescriptions and dependence by offering an effective alternative for pain management. A study published in *Pain Medicine* found that patients receiving acupuncture were significantly less likely to use opioids compared to those who did not receive acupuncture.[71] A 2022 study reported that patients who underwent acupuncture treatment for chronic pain experienced a 21-29% relative reduction in opioid consumption compared to usual care.[72] State-level Medicaid pilot programs have also demonstrated reductions in opioid reliance among patients receiving acupuncture as a covered pain management option.[73]	While recognized by the CDC and ACP as an effective treatment, insurance reimbursement policies vary widely, limiting patient access.[75] Many medical professionals remain skeptical, perceiving acupuncture as a complementary rather than primary treatment.[146] Additionally, some patients are hesitant due to fear of needles or cultural unfamiliarity.[147]

				Additionally, the NIH has found that aural acupuncture reduces pain and opioid consumption in both the short- and long-term.[74]	
Non-Opioid Pharmaceuticals	Non-opioid medications for chronic pain include acetaminophen, NSAIDs, anticonvulsants, antidepressants, and novel analgesics. Acetaminophen primarily acts in the central nervous system by inhibiting prostaglandin synthesis.[148] NSAIDs reduce inflammation and pain by inhibiting COX-1 and COX-2 enzymes.[149] Anticonvulsants like gabapentin and pregabalin decrease nerve excitability by modulating calcium channels.[150] Antidepressants, including tricyclics (amitriptyline) and SNRIs (duloxetine, venlafaxine), influence neurotransmitter levels to enhance pain inhibition.[151]	Acetaminophen inhibits prostaglandin synthesis in the central nervous system, reducing pain perception but lacking anti-inflammatory effects.[148] NSAIDs block COX-1 and COX-2 enzymes, reducing inflammation and nociceptive pain.[149] Anticonvulsants reduce excessive neuronal firing, making them effective for neuropathic pain conditions such as diabetic neuropathy and postherpetic neuralgia.[150,152] Antidepressants increase serotonin and norepinephrine activity, strengthening pain inhibition pathways and improving mood-related pain modulation.[151,153,154] Novel analgesics such as suzetrigine selectively target NaV1.8 sodium channels to reduce pain without opioid-related side effects.[77]	NSAIDs have been found to be as effective as opioids for chronic musculoskeletal pain, with fewer risks of dependence.[29] Acetaminophen is effective for mild-to-moderate pain, but its efficacy for chronic low back pain and osteoarthritis is limited when used alone.[155] When combined with NSAIDs, acetaminophen improved pain relief while reducing the need for increased NSAID doses, minimizing any side effects.[156] Cochrane reviews confirm that pregabalin significantly reduces neuropathic pain,[76] while duloxetine improves function in fibromyalgia and osteoarthritis.[153] Emerging non-opioid pain medications, such as NaV1.8 inhibitors, offer promising new alternatives for chronic pain management.[77]	Non-opioid pharmaceuticals reduce opioid reliance by providing alternative pain relief. Patients prescribed NSAIDs or acetaminophen are significantly less likely to escalate to opioid therapy.[157] Preoperative gabapentin has been shown to decrease postoperative opioid consumption,[158] suggesting a role in multimodal pain management. Multimodal analgesia strategies combining non-opioid medications, physical therapy, and behavioral interventions have successfully minimized opioid prescriptions while maintaining effective pain control.[78]	Acetaminophen carries a risk of hepatotoxicity at high doses, particularly with chronic use.[159] NSAIDs can cause gastrointestinal ulcers, cardiovascular events, and kidney impairment, especially with prolonged use.[160] Anticonvulsants and antidepressants often produce side effects such as dizziness, drowsiness, weight gain, and mood changes.[161] Efficacy varies by patient, requiring trial-and-error approaches to determine optimal treatment regimens.[162] Comprehensive pain management often necessitates a combination of pharmacologic and non-pharmacologic

					strategies to balance efficacy and safety.[78]
Behavioral Therapies	Behavioral therapies encompass cognitive-behavioral therapy (CBT), acceptance and commitment therapy (ACT), and mindfulness-based stress reduction (MBSR). These interventions address the psychological components of chronic pain by restructuring maladaptive thought patterns, enhancing coping mechanisms, and promoting mindfulness-based awareness.[43,79,80]	CBT focuses on identifying and modifying negative thought patterns that amplify pain perception, helping patients develop adaptive coping strategies.[43] ACT encourages patients to accept pain without excessive struggle, fostering psychological flexibility and a values-driven approach to pain management.[163] MBSR incorporates meditation, controlled breathing, and body awareness exercises to reduce stress-related pain amplification and improve emotional regulation.[164] These therapies all modulate the brain's pain-processing pathways, altering how patients perceive and respond to pain.	Meta-analyses and RCTs consistently demonstrate the effectiveness of behavioral therapies in reducing pain intensity, improving physical function, and decreasing psychological distress. A *JAMA Internal Medicine* meta-analysis found that CBT significantly reduced pain-related disability and depressive symptoms in chronic pain patients.[81] ACT has been shown to be as effective as traditional CBT in improving quality of life and reducing pain-related distress.[79] MBSR has been validated in multiple studies, including a *JAMA* randomized controlled trial, as an effective strategy for reducing pain interference and depressive symptoms in chronic pain patients.[82]	Behavioral therapies contribute to opioid reduction by addressing pain perception and psychological distress, which are key drivers of opioid dependence. A study published in *The Journal of Pain* found that veterans with chronic pain who engaged in MBSR reported significant reductions in pain severity and opioid use compared to those receiving usual care.[83] The Department of Veterans Affairs and the CDC now recommend behavioral interventions as first-line treatments for chronic pain to reduce opioid reliance.[28,34]	Access is often limited by a shortage of trained professionals and variable insurance reimbursement policies.[165] Additionally, adherence challenges exist, as some patients struggle with the time commitment or motivation required for therapy.[165] Digital and telehealth-based pain management programs have emerged as potential solutions to increase accessibility and engagement in behavioral interventions.[166]
Other Non-Pharmacological Interventions	Other non-pharmacological interventions include transcutaneous electrical nerve stimulation (TENS) and biofeedback. TENS delivers	TENS therapy stimulates sensory nerves to reduce pain perception by interfering with pain signal transmission to the brain.[167] It enhances the	TENS has been found to be effective in managing neuropathic pain and fibromyalgia. Studies indicate that TENS therapy	By offering self-regulation techniques, TENS and biofeedback can reduce reliance on opioid medications.	TENS and biofeedback require specialized equipment and training, which may limit widespread adoption.

	low-voltage electrical impulses to nerves via skin electrodes, modulating pain perception by disrupting pain signals.[84] Biofeedback therapy trains patients to control physiological functions, such as muscle tension and heart rate, through real-time monitoring and feedback mechanisms.[85] These techniques empower patients to self-manage pain without medication.	release of endogenous opioids and increases blood circulation to affected areas, promoting pain relief.[168] Biofeedback enables patients to consciously regulate physiological responses, reducing muscle tension, autonomic nervous system hyperactivity, and stress-related pain responses.[85]	provides pain relief, particularly in patients with chronic musculoskeletal pain.[168] Biofeedback has demonstrated efficacy in reducing pain severity and improving autonomic nervous system regulation. A systematic review confirmed that biofeedback enhances relaxation, decreases muscle tension, and contributes to sustained pain relief in chronic pain populations.[169]	Patients using biofeedback report improved pain coping skills and reduced need for pharmacological interventions.[169] Studies on non-invasive pain management strategies highlight the role of these modalities in multimodal treatment approaches designed to minimize opioid use.[169,170]	Effectiveness varies by individual, with some patients experiencing significant relief while others report minimal benefit.[169,170] Additionally, long-term efficacy remains uncertain, and some patients may require continued use to maintain results.[171,172] Access may also be restricted by provider availability and insurance coverage limitations.[75]